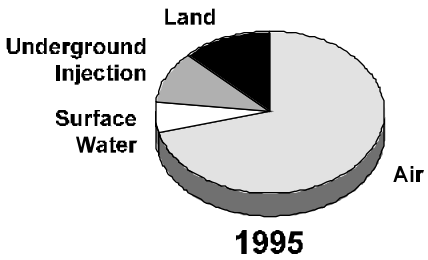
CHAPTER 4 - EXHIBITS



Chapter 4

1995 Toxics Release Inventory

This chapter provides information reported by facilities for calendar year 1995. It includes data facilities submitted for all chemicals reportable for 1995, including the 286 newly added chemicals and chemical categories.[1] The chapter presents releases of these toxic chemicals from the facilities as well as transfers of chemicals in waste to off-site locations for further processing or disposal. It also presents data on management of TRI chemicals in waste on-site or by transfer off-site. Each section supplies an overview of national data and summary analyses by state, industry, and chemical.

TRI Releases and Transfers

Box 4-1 describes on-site releases reportable to TRI and the types of activities that may contribute releases to various environmental media. Box 4-2 lists off-site transfers for waste management or further processing that are reportable to TRI.

WHAT TO CONSIDER WHEN USING TRI DATA

Users of TRI information should be aware that TRI data reflect releases and transfers of chemicals, not exposures of the public to those chemicals. The TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and transfers of toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical after it is released, and the human or other populations that are exposed to the chemical after its release. Listed below are some of the factors that should be considered when reviewing TRI data.

Toxicity of the Chemical

The TRI list consists of chemicals that vary widely in their ability to produce toxic effects.

- Some high-volume releases of less toxic chemicals may appear to be a more serious

[1] Of the 286 chemicals, 20 were diisocyanates and 19 were polyaromatic compounds. These are reported not as individual chemicals, but as 2 chemical compounds. Furthermore, 3 other chemicals have been remanded, and one chemical was not reportable for 1995 because of an administrative stay. Therefore, the number of reportable chemicals added to the TRI in 1995 was 245.

An Explanation of Releases

Releases. A release is an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells. Releases are reported to TRI by media type.

Releases to Air. Releases to air are reported either as stack or fugitive emissions. Stack emissions are releases to air that occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions are all releases to air that are not released through a confined air stream. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

Releases to Water. Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes or open trenches. Releases due to runoff, including stormwater runoff, are also reportable to TRI.

Underground Injection. Underground injection is a contained release of a fluid into a subsurface well for the purpose of waste disposal. Wastes containing TRI chemicals are injected into either Class I wells or Class V wells. Class I wells are used to inject liquid hazardous wastes or dispose of industrial and municipal wastewaters beneath the lowermost underground source of drinking water. Class V wells are generally used to inject non-hazardous fluid into or above an underground source of drinking water. TRI reporting does not currently distinguish between these two types of wells, although there are important differences in environmental impact between these two methods of injection. However, 1996 reports will provide this distinction.

Releases to Land. Releases to land occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals in landfills (in which wastes are buried), land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal methods (such as spills, leaks, or waste piles). For the 1996 reporting year, reporters will be requested to distinguish between RCRA subtitle C landfills and all other landfills.

Box 4-1. An Explanation of Releases.

problem than lower-volume releases of highly toxic chemicals, when just the opposite may be true.

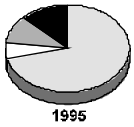
For example, phosgene is toxic in smaller quantities than methanol, and a comparison between these two chemicals for setting hazard priorities or estimating potential health concerns, solely on the basis of volume released, may be misleading.

Exposure Considerations

- Potential degradation or persistence of the chemical in the environment.

Exposure to a chemical is dependent upon the chemical being available. The potential for exposure is greater the longer the chemical remains unchanged in the environment. Sunlight, heat, or microorganisms may or may not decompose the chemical.

- For example, microorganisms readily degrade some chemicals, such as methanol, into less toxic chemicals; volatile organic chemicals, such as ethylene and propylene, react in the atmosphere, contributing to the formation of smog; metals are persistent and will not degrade upon release to the environment.



An Explanation of Transfers

Off-site Transfers. An off-site transfer is a transfer of toxic chemicals in waste to a facility that is geographically or physically separate from the facility reporting under TRI. Chemicals reported to TRI as transferred are sent to off-site facilities for the purposes of recycling, energy recovery, treatment, or disposal. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment.

Transfers to Publicly Owned Treatment Works (POTWs). A POTW is a wastewater treatment facility that is owned by a state or municipality. Wastewaters from facilities reporting under TRI are transferred through pipes or sewers to a POTW. Treatment or removal of a chemical from the wastewater depends upon the nature of the chemical, as well as the treatment methods present at the POTW. In general, chemicals that are easily utilized as nutrients by microorganisms, or have a low solubility in water, are likely to be removed to some extent. Chemicals that are volatile and have a low solubility in water may evaporate into the atmosphere. Not all TRI chemicals can be treated or removed by a POTW. Some chemicals, such as metals, may be removed, but are not destroyed and may be disposed of in landfills or discharged to receiving waters.

Transfers Off-site for Recycling. Toxic chemicals in waste that are sent off-site for the purposes of recycling are generally recovered or regenerated by a variety of recycling methods, including solvent recovery, metals recovery, and acid regeneration. The choice of the recycling method depends on the toxic chemical being sent for recycling. Once they have been recycled, these chemicals may be returned to the originating facility for further processing or made available for use in commerce.

Transfers Off-site for Energy Recovery. Toxic chemicals in waste sent off-site for purposes of energy recovery are combusted off-site in industrial furnaces (including kilns) or boilers that generate heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers Off-site for Treatment. Toxic chemicals in waste that are transferred off-site may be treated through a variety of methods, including biological treatment, neutralization, incineration, and physical separation. These methods typically result in varying degrees of destruction of the toxic chemical. In some cases (such as stabilization or solidification), the chemical is not destroyed but is prepared for further waste management, such as contained disposal.

Transfers Off-site for Disposal. Toxic chemicals in waste that are transferred to a facility for disposal generally are either released to land (see Box 1-1) at an off-site facility or are injected underground.

Other Off-site Transfers. In this report, toxic chemicals in waste that were reported as transferred off-site but for which the off-site activity (i.e., treatment, disposal, energy recovery, or recycling) was not specified or was not an accepted code have been classified as "other off-site transfers."

Box 4-2. An Explanation of Transfers.

  - As a result, smaller releases of a persistent highly toxic chemical may create a more serious problem than larger releases of a chemical that is rapidly converted to a less toxic form.

- Bioconcentration of the chemical in the food chain.

As a chemical becomes incorporated in the food chain, it may concentrate or disperse as it moves up the food chain.

  - Some chemicals, such as mercury, will accumulate as they move up the food chain.

- Small releases of a chemical that bioaccumulates may result in significant exposures to consumers.

◆ The environmental medium (air, water, land, or underground injection) to which the toxic chemical has been released.

Chemical exposure of a population depends on the environmental medium to which a chemical is released. The medium also affects the types of exposures possible, such as inhalation, dermal exposure, or ingestion.

- Releases of a chemical to the air can result in exposures to organisms living near and downwind from facilities releasing toxic chemicals to the atmosphere. Persistent chemicals may fall or be rained out of air onto land or into water bodies, resulting in exposures via these environmental media.

- Exposures that may result from releases to water bodies (streams, lakes, etc.) depend in part on the downstream uses of the water, including drinking, cooking, and bathing.

- Injection of toxic chemicals into properly designed and constructed Class I wells will result in substantially lower exposure potential than more direct forms of environmental release. These wells are designed to entomb liquid wastes for at least 10,000 years.

◆ The type of off-site facility receiving the chemical and the efficiency of its waste management practices.

The amount of a toxic chemical that ultimately enters the environment depends upon how the chemical was handled during disposal, treatment, energy recovery, or recycling activities. Several factors to keep in mind when considering amounts sent off-site are presented below.

- The efficiency of recycling operations varies depending upon the method of recycling and the chemical being recycled.

- Use of a combustible toxic chemical for energy recovery typically results in the destruction of 95% to 99% or more of the toxic chemical. The remaining quantity may be either released to air or disposed of in ash to land.

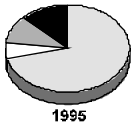
- The efficiency of the treatment of toxic chemicals in waste sent to sewage treatment plants varies depending on the chemical and the sewage plant. Some high-volume pollutants such as methanol are readily degraded by most sewage treatment plants. Other high-volume chemicals such as ammonia are not readily treated by most sewage treatment plants and will pass through the plant into the aquatic environment. The efficiency of other treatment methods, such as incineration, also depends upon the specifications of the treatment facility and the nature of the chemical.

- Toxic chemicals in waste sent off-site for disposal are typically released to land or injected underground.

Further information on the use of TRI data in determining potential risks can be found in "Toxic Chemical Risk Screening Guide" (EPA 560/2-89-002), July 1989.

1995 NATIONAL OVERVIEW

In this chapter, all chemicals reported under TRI are discussed and analyzed, including those added in the chemical expansion for the 1995



1995 Releases	Pounds
Total Releases	2,208,749,411
Fugitive Air	385,094,609
Point Source Air	1,177,227,504
Surface Water	136,315,624
Underground Injection	234,979,709
On-site Land Releases	275,131,965

Table 4-1. TRI Releases, 1995.

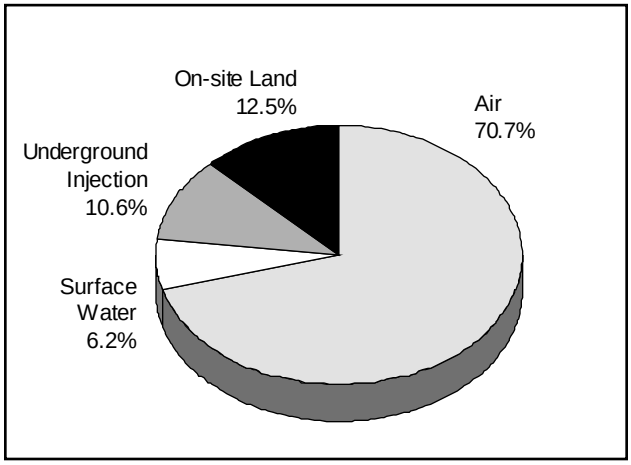


Figure 4-1. Distribution of TRI Releases, 1995.

1995 Transfers	Pounds
Total Transfers	3,534,827,951
Transfers to Recycling	2,213,731,389
Transfers to Energy Recovery	512,029,726
Transfers to Treatment	287,576,863
Transfers to POTWs	239,836,516
Transfers to Disposal	279,222,397
Other Off-site Transfers❷	2,431,060

Table 4-2. TRI Transfers, 1995.

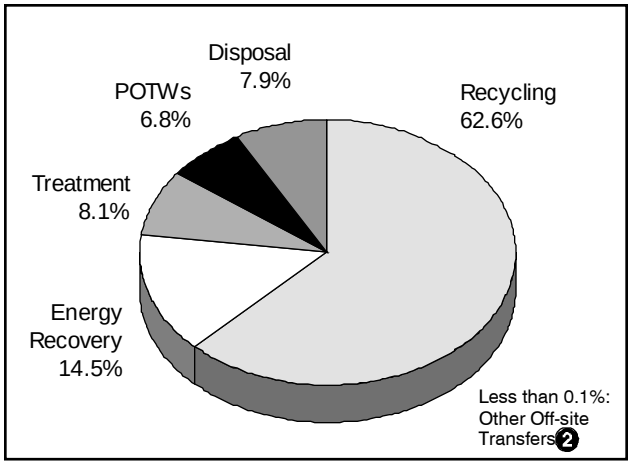


Figure 4-2. Distribution of TRI Transfers, 1995.

reporting year. Chapter 5 examines chemical reporting over time, using only those chemicals required to be reported in the prior years.

In 1995, 21,951 facilities filed 73,311 TRI reporting forms. These facilities reported releasing nearly 2.21 billion pounds of toxic chemicals into the environment (see Table 4-1). This includes amounts released directly to the air, water, or land, as well as disposal of toxic chemicals on-site in landfills, impoundments, waste piles, and underground injection wells.

Air emissions totaled 1.56 billion pounds, or 70.7% of all releases in 1995 (see Figure 4-1). Facilities report their air releases as either point source (stack) emissions or as fugitive (non-point source) emissions. Three-quarters (75.4%) of air releases reported to TRI in 1995 were point source emissions.

Facilities discharged 136.3 million pounds of toxic chemicals into the nation's rivers, lakes, bays, and other bodies of water in 1995. This represents 6.2% of all releases in 1995. Nearly 235.0 million pounds (10.6%) of toxic chemi-

❷ Transfers reported without valid waste management codes.

cals were injected into underground wells, and 275.1 million pounds (12.5%) were released to land. These tables represent underground injection as a release to the environment.

Facilities sent 3.53 billion pounds of toxic chemicals to off-site locations for treatment, disposal, energy recovery, and recycling in 1995 (see Table 4-2). The great majority of these off-site transfers (2.21 billion pounds, or 62.6%) was sent off-site to be recycled (see Figure 4-2). Another 512.0 million pounds (14.5%) of toxic chemicals were sent off-site to be burned for energy recovery. Transfers to other locations for treatment totaled 287.6 million pounds, or 8.1%, while transfers to Publicly Owned Treatment Works (POTWs, or sewage treatment plants) totaled 239.8 million pounds, or 6.8%. Transfers of toxic chemicals off-site for disposal totaled 279.2 million pounds, or 7.9%. An additional 2.4 million pounds of toxic chemicals reported as transferred off-site were reported with no waste management codes or invalid codes and are listed as "Other Off-site Transfers."

"Form A" Reporting

Of the 73,311 TRI reporting forms submitted in 1995, 6,437 are "certification" forms that do not report amounts of chemical releases, transfers, and on-site waste management activities. EPA established a reduced reporting option, beginning in 1995, for facilities that meet TRI reporting thresholds for a listed chemical (manufacturing or processing 25,000 pounds or otherwise using 10,000 pounds), but whose "total annual reportable amount" for that chemical does not exceed 500 pounds. The total annual reportable amount is the sum of the waste management categories that would be reported to TRI. Waste management categories include: quantities released (including disposal), recovered as a result of recycling operations, combusted for energy recovery, or treated at the facility, plus amounts transferred off-site for recycling, energy recovery, treatment, and/or disposal. These amounts correspond to total production-related waste in this report.

A facility that does not exceed the 500-pound criterion and does not manufacture, process, or otherwise use more than 1 million pounds of the chemical during the year is eligible to submit a "certification" form. This form identifies the facility and chemical but does not require reporting of any amounts. The number of these forms submitted appears as "Form As" on the tables in this chapter.

TRI CHEMICAL EXPANSION FOR THE 1995 REPORTING YEAR

Beginning with the 1995 reporting year, EPA added 286 chemicals and chemical categories to TRI, nearly doubling its previous chemical coverage (see Box 4-3.). As shown in Table 4-3, releases of the newly added chemicals totaled 237.7 million pounds, which represents one tenth (10.8%) of releases reported for all TRI chemicals in 1995. Off-site transfers totaled 155.1 million pounds, a much smaller portion (4.4%) of transfers reported for all TRI chemicals. As discussed later in this chapter, total production-related waste of the new chemicals account for 32.2% of production-related waste of all chemicals.

Facilities submitted 4,410 forms on the added chemicals; one in seven were Form As. Average releases per Form R for the new chemicals was almost double the average releases per Form R for all TRI chemicals reported in 1995. The pounds/Form R are 63,359 for the new chemicals and 33,029 for all TRI chemicals. There were 499 facilities that reported only on the new chemicals—2.3% of all facilities that reported in 1995.

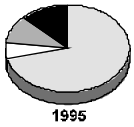


Table 4-3. TRI Releases and Transfers, Newly Added Chemicals Compared to Other TRI Chemicals, 1995.

	Newly Added Chemicals Number	All TRI Chemicals Number	Newly Added as Percent of All TRI Chemicals Percent
Total Forms	4,410	73,311	6.0
Form As	658	6,437	10.2
	Pounds	Pounds	Percent
Total Air Emissions	89,474,626	1,562,322,113	5.7
Fugitive Air	26,370,105	385,094,609	6.8
Point Source Air	63,104,521	1,177,227,504	5.4
Surface Water Discharges	90,243,306	136,315,624	66.2
Underground Injection	54,116,863	234,979,709	23.0
On-site Land Releases	3,887,775	275,131,965	1.4
Total Releases	237,722,570	2,208,749,411	10.8
Transfers to Recycling	29,473,788	2,213,731,389	1.3
Transfers to Energy Recovery	24,832,143	512,029,726	4.8
Transfers to Treatment	31,029,283	287,576,863	10.8
Transfers to POTWs	59,387,743	239,836,516	24.8
Transfers to Disposal	10,357,700	279,222,397	3.7
Other Off-site Transfers❸	7,734	2,431,060	0.3
Total Transfers	155,088,391	3,534,827,951	4.4
Total Releases and Transfers	392,810,961	5,743,577,362	6.8

Number of Chemicals Added for the Reporting Year 1995

On November 30, 1994, EPA finalized a rule that added 286 chemicals and chemical categories to the EPCRA section 313 list of toxic chemicals. The 286 number includes 243 individually listed chemicals, 19 chemicals in the polycyclic aromatic compounds (PACs) category, 20 chemicals in the diisocyanates category, and four other chemical categories. Counting the diisocyanates category and the PACs category as two new categories rather than as 39 chemicals, the number of chemicals and chemical categories added is 249 (243 individually listed chemicals and six chemical categories). However, in the spring of 1996, three chemicals [dimethyldichlorosilane (CAS# 75-78-5), methyltrichlorosilane (CAS# 75-79-6), and trimethylchlorosilane (CAS# 75-77-4)] were voluntarily remanded from the list. In addition, one chemical [2,2-dibromo-3-nitrilopropionamide (CAS# 10222-01-2)] is under an administrative stay and was not reportable for the 1995 reporting year. Therefore, the number of new chemicals and chemical categories reportable for the 1995 reporting year is 282. While the two categories, diisocyanates and polycyclic aromatic compounds, list 39 chemicals out of the 282, the 39 chemicals are not reported separately. One Form R is submitted for all chemicals in each of the categories. These two categories are the only ones of the TRI categories that list individual chemicals.

Box 4-3. Number of Chemicals Added for the Reporting Year 1995

❸ Transfers reported without valid waste management codes.

EPA sees many benefits of the information reported for the newly added chemicals. For example, many of these newly added chemicals are chemicals potentially affecting children's health, others are carcinogens and toxic chemicals used as pesticides, and some are released in great quantities to the air, potentially affecting air quality and respiratory health. However, the volume of reported releases is only one important piece of information. It must be combined with hazard and exposure data for a chemical. The original TRI list of chemicals captured most of the high production volume chemicals, so the reported releases of most newly added chemicals are lower, but the newly added chemicals all demonstrate high to moderately high toxicity and the reporting of their releases to the environment provides important right-to-know information.

The chemicals added for the 1995 reporting year were added as a result of efforts to review many different types of chemicals and discern which meet the EPCRA section 313 listing criteria. In performing the chemical expansion, data on the chemicals and chemical categories were reviewed for evidence indicating adverse acute toxicity, carcinogenicity, mutagenicity, developmental and reproductive effects, neurotoxicity, other chronic effects, and environmental effects. Information on environmental fate was also reviewed. For each chemical proposed for addition to EPCRA section 313 in this rulemaking, EPA conducted an extensive hazard assessment to determine whether the chemical met one or more of the EPCRA section 313 (d)(2) listing criteria. Only after this careful review was a final determination made as to whether one of the EPCRA section 313 (d)(2) listing criteria was met for an individual chemical or chemical category. EPA need only show that one of the listing criteria is met in order to list a chemical or chemical category under EPCRA section 313, therefore the proposed and final rules that added these chemicals did not necessarily address all endpoints of concern for a particular chemical.

Although only 6.0% of all forms submitted were for newly added chemicals, they account for two thirds (66.2%) of all surface water discharges and 23.0% of underground injections, as Table 4-3 illustrates. One addition to the TRI list for 1995 accounts for most of this difference: More nitrate compounds, newly reportable in 1995, are discharged to water than any other chemical on the TRI list (88.5 million pounds). Nitrate compounds are also the chemical most reported—among all TRI chemicals—as injected to underground wells (46.3 million pounds).

This reporting of nitrate compounds significantly influences the distribution by type of release for newly added chemicals, as compared to that of other TRI chemicals (see Table 4-4). Surface water discharges account for 38.0% of releases reported for the 286 new chemicals and chemical categories, but only 2.3% of the releases reported for all other TRI chemicals. Facilities also reported underground injection amounting to 22.8% of all releases for the new chemicals, compared to 9.2% for other TRI chemicals.

Table 4-5 shows the differences in distribution of transfers (by waste management activity) of the chemicals added for the 1995 reporting year, compared to chemicals already on the TRI list. Transfers to POTWs account for 38.3% of transfers for the new chemicals, compared to 5.3% for other TRI chemicals. Transfers to treatment represent 20.0% of all transfers of added chemicals and 7.6% of transfers of previously reportable chemicals. For the newly added chemicals, transfers to recycling and energy recovery are correspondingly smaller.

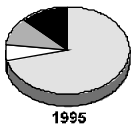


Table 4-4. TRI Releases by Release Type, Newly Added Chemicals Compared to Other TRI Chemicals, 1995.

	Newly Added Chemicals Pounds	Percent of Total Percent	Other TRI Chemicals Pounds	Percent of Total Percent	All TRI Chemicals Pounds	Percent of Total Percent
Total Air Emissions	89,474,626	37.6	1,472,847,487	74.7	1,562,322,113	70.7
Fugitive Air	26,370,105	11.1	358,724,504	18.2	385,094,609	17.4
Point Source Air	63,104,521	26.5	1,114,122,983	56.5	1,177,227,504	53.3
Surface Water Discharges	90,243,306	38.0	46,072,318	2.3	136,315,624	6.2
Underground Injection	54,116,863	22.8	180,862,846	9.2	234,979,709	10.6
On-site Land Releases	3,887,775	1.6	271,244,190	13.8	275,131,965	12.5
Total Releases	237,722,570	100.0	1,971,026,841	100.0	2,208,749,411	100.0

Table 4-5. TRI Transfers by Waste Management Activity, Newly Added Chemicals Compared to Other TRI Chemicals, 1995.

	Newly Added Chemicals Pounds	Percent of Total Percent	Other TRI Chemicals Pounds	Percent of Total Percent	All TRI Chemicals Pounds	Percent of Total Percent
Transfers to Recycling	29,473,788	19.0	2,184,257,601	64.6	2,213,731,389	62.6
Transfers to Energy Recovery	24,832,143	16.0	487,197,583	14.4	512,029,726	14.5
Transfers to Treatment	31,029,283	20.0	256,547,580	7.6	287,576,863	8.1
Transfers to POTWs	59,387,743	38.3	180,448,773	5.3	239,836,516	6.8
Transfers to Disposal	10,357,700	6.7	268,864,697	8.0	279,222,397	7.9
Other Off-site Transfers❹	7,734	0.0	2,423,326	0.1	2,431,060	0.1
Total Transfers	155,088,391	100.0	3,379,739,560	100.0	3,534,827,951	100.0

1995 TRI DATA BY STATE

Tables 4-6 and 4-7 present the distribution of TRI releases and transfers by state. No reports were received in 1995 for the Northern Mariana Islands.

The top states for total releases for 1995 reporting were Texas with 283.9 million pounds, Louisiana with 172.3 million pounds, Ohio with 121.9 million pounds, Tennessee with 111.2 million pounds, and Alabama with 102.8 million pounds. Third-ranked Ohio had the largest number of reporting facilities (1,623) and Form As (485) in 1995, but Texas had a greater number of total forms (5,705). California, with the second largest number of reporting facilities (1,478) and the fourth largest number of total forms (4,151), ranked 19th for total releases. In contrast, Louisiana had 314 reporting facilities—fewer than 25 other states—but ranked second for total releases.

States reporting the largest volumes to individual media in 1995 were Texas, 128.7 million pounds emitted to air and 118.9 million pounds injected underground; Louisiana 28.3 million pounds discharged to surface water; and Montana, 39.4 million pounds released on-site to land.

❹ Transfers reported without valid waste management codes.

Table 4-6. TRI Releases by State, 1995 (Alphabetically Ordered).

State	Facilities Number	Total Forms Number	Form As Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Alabama	520	1,927	212	91,867,818	3,589,626	16	7,307,586	102,765,046
Alaska	10	40	6	5,405,584	1,070,617	193	483,911	6,960,305
American Samoa	1	1	0	5,300	0	0	0	5,300
Arizona	187	491	48	7,306,986	4,829	14	28,520,806	35,832,635
Arkansas	387	1,260	117	29,792,097	916,093	2,637,068	1,336,719	34,681,977
California	1,478	4,151	348	36,819,632	2,641,665	478,974	2,786,805	42,727,076
Colorado	182	495	78	4,159,933	294,179	0	121,314	4,575,426
Connecticut	329	958	43	7,179,523	1,489,456	0	95,110	8,764,089
Delaware	71	243	29	4,209,960	286,148	0	14,327	4,510,435
District of Columbia	3	5	0	10,460	255	0	19,000	29,715
Florida	528	1,384	160	32,028,305	821,305	25,343,332	25,779,920	83,972,862
Georgia	718	2,259	381	47,606,516	6,345,066	0	1,572,312	55,523,894
Guam	1	1	0	0	3,100	0	0	3,100
Hawaii	16	57	11	443,607	1,510	24,306	545	469,968
Idaho	60	183	10	4,689,903	1,390,186	0	2,107,947	8,188,036
Illinois	1,334	4,489	419	70,935,342	5,779,855	365	23,037,696	99,753,258
Indiana	1,008	3,299	221	70,573,627	2,357,535	3,398	6,843,418	79,777,978
Iowa	410	1,184	109	29,600,556	3,783,443	0	1,381,081	34,765,080
Kansas	279	952	71	19,450,900	394,121	1,674,129	1,297,174	22,816,324
Kentucky	418	1,560	98	40,703,729	432,680	0	788,794	41,925,203
Louisiana	314	2,118	159	84,841,485	28,268,576	54,494,533	4,654,598	172,259,192
Maine	92	325	38	9,242,209	610,781	0	314,865	10,167,855
Maryland	194	610	74	8,868,815	1,881,350	0	2,571,728	13,321,893
Massachusetts	509	1,424	125	7,996,222	116,200	0	28,631	8,141,053
Michigan	903	3,303	208	62,996,379	653,999	7,566,827	4,046,748	75,263,953
Minnesota	493	1,340	142	21,559,433	375,055	0	525,136	22,459,624
Mississippi	322	1,086	99	44,048,247	8,373,840	82,251	4,250,916	56,755,254
Missouri	568	1,902	176	31,778,685	3,282,973	0	14,585,208	49,646,866
Montana	27	154	11	4,374,595	96,659	0	39,420,586	43,891,840
Nebraska	164	490	64	10,014,706	283,104	0	660,179	10,957,989
Nevada	36	91	8	1,349,667	0	0	2,209,741	3,559,408
New Hampshire	99	274	40	2,472,394	79,718	0	10,960	2,563,072
New Jersey	607	2,170	214	12,728,407	1,632,366	5	284,578	14,645,356
New Mexico	37	155	13	1,892,903	1,153	0	16,812,196	18,706,252
New York	723	2,138	155	30,045,576	5,334,499	5	1,192,979	36,573,059
North Carolina	874	2,609	257	65,805,573	2,622,401	0	17,732,509	86,160,483
North Dakota	35	92	13	2,538,973	21,589	0	1,275	2,561,837
Ohio	1,623	5,442	485	73,749,306	3,433,797	14,469,938	30,217,526	121,870,567
Oklahoma	270	838	70	23,563,664	718,224	10,238	661,337	24,953,463
Oregon	261	735	54	18,949,703	597,554	0	1,647,454	21,194,711
Pennsylvania	1,213	3,961	306	47,232,633	5,487,942	0	1,539,478	54,260,053
Puerto Rico	163	511	26	9,397,960	22,262	0	4,456	9,424,678
Rhode Island	145	378	41	2,734,284	48,475	0	40	2,782,799
South Carolina	494	1,833	167	51,850,487	1,747,320	0	741,224	54,339,031
South Dakota	72	139	13	1,911,132	1,487	0	387	1,913,006
Tennessee	633	2,132	163	103,130,070	1,549,615	1,174,570	5,328,644	111,182,899
Texas	1,193	5,705	447	128,694,945	23,413,945	118,850,176	12,973,077	283,932,143
Utah	148	494	70	69,215,983	16,236	0	7,089,515	76,321,734
Vermont	38	82	3	547,459	2,712	0	2,674	552,845
Virgin Islands	2	26	1	1,403,451	30,876	0	2,461	1,436,788
Virginia	447	1,459	102	50,856,146	872,506	0	1,184,680	52,913,332
Washington	286	896	75	24,025,989	2,367,757	0	57,224	26,450,970
West Virginia	139	690	22	18,393,929	8,665,922	1,000	296,542	27,357,393
Wisconsin	858	2,616	210	28,534,060	2,094,078	5	549,601	31,177,744
Wyoming	29	154	25	2,786,865	8,984	8,168,366	38,347	11,002,562
Total	21,951	73,311	6,437	1,562,322,113	136,315,624	234,979,709	275,131,965	2,208,749,411

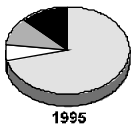


Table 4-7. TRI Transfers by State, 1995 (Alphabetically Ordered).

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[5] Pounds	Total Transfers Pounds
Alabama	34,802,196	14,368,339	6,280,748	729,492	12,546,578	2,320	68,729,673
Alaska	1,320	10	30	0	6,030	0	7,390
American Samoa	0	0	0	0	0	0	0
Arizona	51,003,644	982,175	9,048,997	2,109,541	562,822	0	63,707,179
Arkansas	55,060,457	6,626,109	1,887,199	262,744	1,664,073	3,928	65,504,510
California	80,855,326	9,017,845	11,708,182	12,883,050	9,191,657	10,763	123,666,823
Colorado	11,460,385	3,597,064	1,139,953	680,950	298,241	250	17,176,843
Connecticut	26,363,774	2,398,717	7,021,857	1,315,127	1,548,412	2,140	38,650,027
Delaware	17,131,437	2,427,102	899,151	3,212,904	94,065	0	23,764,659
District of Columbia	13,250	0	0	580	27,000	0	40,830
Florida	13,274,491	1,771,722	2,946,893	6,099,311	2,606,350	14,055	26,712,822
Georgia	33,320,605	7,982,367	3,880,967	2,038,831	3,532,744	1,755	50,757,269
Guam	0	0	0	15,000	0	0	15,000
Hawaii	113,527	5	8,604	0	163,769	0	285,905
Idaho	544,954	56,571	74,190	496,515	17,517	0	1,189,747
Illinois	103,687,255	30,932,803	13,187,222	12,792,226	15,783,290	3,214	176,386,010
Indiana	211,594,993	11,475,570	9,691,307	2,310,576	25,485,924	2,605	260,560,975
Iowa	37,052,579	4,375,651	2,371,689	8,467,036	1,971,659	0	54,238,614
Kansas	41,046,002	2,433,777	2,637,049	646,862	6,065,953	250	52,829,893
Kentucky	49,671,058	7,991,087	9,679,176	1,610,886	2,804,841	87,150	71,844,198
Louisiana	52,716,144	12,836,007	9,840,800	44,015	2,287,543	0	77,724,509
Maine	2,686,609	478,882	376,017	164,308	1,334,986	0	5,040,802
Maryland	10,983,751	1,551,273	2,173,159	3,088,263	4,832,591	0	22,629,037
Massachusetts	26,684,031	6,079,182	5,605,727	6,112,395	1,261,503	1,005	45,743,843
Michigan	112,624,083	66,466,971	20,167,166	11,244,415	29,418,954	1,000	239,922,589
Minnesota	21,179,660	2,569,785	876,267	7,691,857	1,426,322	300	33,744,191
Mississippi	32,918,871	3,361,417	1,959,295	767,536	1,801,727	1,852,705	42,661,551
Missouri	57,354,293	25,388,101	9,012,053	7,018,899	3,763,234	6,800	102,543,380
Montana	139,551	20,852	34,269	992	38,306	0	233,970
Nebraska	31,002,181	644,319	332,644	380,366	3,742,551	0	36,102,061
Nevada	2,016,251	6,736	2,919	7,537	57,099	0	2,090,542
New Hampshire	10,205,010	387,691	377,326	127,841	79,647	0	11,177,515
New Jersey	47,204,077	31,003,038	8,022,019	22,531,441	1,649,366	6,696	110,416,637
New Mexico	877,976	304,736	70,387	322,601	76,940	0	1,652,640
New York	74,663,319	10,783,379	5,892,797	7,576,893	4,739,214	720	103,656,322
North Carolina	96,766,275	10,824,835	12,363,268	3,137,648	3,694,773	12,649	126,799,448
North Dakota	1,134,677	23,517	20,066	639,553	23,796	0	1,841,609
Ohio	218,318,041	38,110,541	17,335,393	16,019,258	28,925,166	160,395	318,868,794
Oklahoma	20,347,336	3,016,680	907,811	155,133	3,502,678	250	27,929,888
Oregon	21,298,486	1,067,693	4,564,370	9,656,048	1,328,699	23,842	37,939,138
Pennsylvania	139,094,454	16,927,716	19,230,368	8,074,292	57,577,916	172,048	241,076,794
Puerto Rico	11,728,018	10,162,069	5,905,827	2,607,497	411,369	0	30,814,780
Rhode Island	14,159,508	874,836	515,617	439,410	451,381	250	16,441,002
South Carolina	101,510,186	10,500,648	5,764,675	3,885,743	3,499,310	0	125,160,562
South Dakota	682,774	158,806	116,964	444,246	90,911	0	1,493,701
Tennessee	58,195,383	5,961,992	5,695,820	4,746,374	8,230,485	34,804	82,864,858
Texas	133,162,715	106,463,123	49,449,843	41,325,733	12,871,575	29,166	343,302,155
Utah	5,856,703	97,386	584,532	506,295	500,982	0	7,545,898
Vermont	1,715,551	19,461	292,141	3,789	28,396	0	2,059,338
Virgin Islands	122,698	51,700	192,129	0	5	0	366,532
Virginia	34,741,028	7,732,970	2,286,989	16,429,787	2,105,457	0	63,296,231
Washington	14,176,731	671,708	647,512	2,560,092	1,618,149	0	19,674,192
West Virginia	35,542,767	11,179,882	4,176,772	2,013,907	3,613,503	0	56,526,831
Wisconsin	54,857,751	19,863,268	10,319,023	4,440,697	9,859,043	0	99,339,782
Wyoming	67,247	1,612	1,684	24	7,895	0	78,462
Total	2,213,731,389	512,029,726	287,576,863	239,836,516	279,222,397	2,431,060	3,534,827,951

[5] Transfers reported without valid waste management codes.

Table 4-8. TRI Releases of Newly Added Chemicals Compared to Other TRI Chemicals for Top 10 States with Largest Total Releases, 1995.

State	Newly Added Chemicals Pounds	Rank	Other TRI Chemicals Pounds	Rank	All TRI Chemicals Pounds	Rank
Texas	58,507,596	1	225,424,547	1	283,932,143	1
Louisiana	19,341,166	2	152,918,026	2	172,259,192	2
Ohio	6,429,108	11	115,441,459	3	121,870,567	3
Tennessee	2,883,321	21	108,299,578	4	111,182,899	4
Alabama	3,616,032	18	99,149,014	5	102,765,046	5
Illinois	17,154,180	3	82,599,078	6	99,753,258	6
North Carolina	4,340,027	16	81,820,456	7	86,160,483	7
Florida	14,109,358	4	69,863,504	11	83,972,862	8
Indiana	6,909,739	10	72,868,239	10	79,777,978	9
Utah	99,522	45	76,222,212	8	76,321,734	10
Subtotal	133,390,049		1,084,606,113		1,217,996,162	
Total	237,722,570		1,971,026,841		2,208,749,411	

Texas reported more total off-site transfers than any other state, 343.3 million pounds in 1995. Other states in the top five were Ohio (318.9 million pounds), Indiana (260.6 million pounds), Pennsylvania (241.1 million pounds), and Michigan (239.9 million pounds).

According to the transfer destination code, the largest states reporting were Ohio, whose facilities transferred 218.3 million pounds for recycling (followed by Indiana with 211.6 million pounds); Texas, with 106.5 million pounds to energy recovery, 49.4 million pounds to treatment, and 41.3 million pounds to POTWs; and Pennsylvania, 57.6 million pounds disposed of off-site.

Newly Reportable Chemicals, by State

Tables 4-8 and 4-9 compare reporting for new chemicals and previously reportable TRI chemicals for the top 10 states for total releases and for total transfers.

Facilities in Texas reported the largest total releases of both new chemicals and previously reportable chemicals in 1995, and Louisiana similarly ranked second for both new and prior TRI chemicals. Illinois was third for releases of new chemicals and sixth for releases of other TRI chemicals. Only one of the top 10 states for total releases would not remain in the top 10 without the additional chemicals. Florida would drop from eighth to 11th, and Michigan would move into the top 10.

For total transfers, the only effect of the additional reporting on the ranking of the top 10 states is that Texas and Ohio—first and second for total transfers—would exchange ranks if the new chemicals were excluded.

Texas facilities accounted for a significantly higher percentage of the new-chemical reporting than for other TRI chemicals. Texas reported 24.6% of total releases of added chemicals versus 11.4% of releases of other TRI chemicals. Texas also reported 30.9% of total transfers of added chemicals versus 8.7% of transfers of other chemicals.

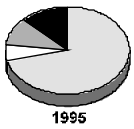


Table 4-9. TRI Transfers of Newly Added Chemicals Compared to Other TRI Chemicals for Top 10 States with Largest Total Transfers, 1995.

State	Newly Added Chemicals Pounds	Rank	Other TRI Chemicals Pounds	Rank	All TRI Chemicals Pounds	Rank
Texas	47,864,893	1	295,437,262	2	343,302,155	1
Ohio	10,827,446	2	308,041,348	1	318,868,794	2
Indiana	9,793,203	3	250,767,772	3	260,560,975	3
Pennsylvania	2,923,686	14	238,153,108	4	241,076,794	4
Michigan	9,511,395	4	230,411,194	5	239,922,589	5
Illinois	2,061,380	19	174,324,630	6	176,386,010	6
North Carolina	4,441,353	10	122,358,095	8	126,799,448	7
South Carolina	1,652,559	22	123,508,003	7	125,160,562	8
California	4,907,966	8	118,758,857	9	123,666,823	9
New Jersey	2,519,064	17	107,897,573	10	110,416,637	10
Subtotal	96,502,945		1,969,657,842		2,066,160,787	
Total	155,088,391		3,379,739,560		3,534,827,951	

1995 TRI DATA BY INDUSTRY

Tables 4-10 and 4-11 present TRI releases and transfers by industry group, in the order of their Standard Industrial Classification (SIC) codes. On TRI Form Rs and Form As, facilities report their SIC codes at the four-digit level—for example, SIC code 2873, Nitrogenous Fertilizers. These specific industries are grouped into broader categories at the three-digit and two-digit SIC code levels; for example, Nitrogenous Fertilizers falls into the Agricultural Chemicals group at the three-digit level (SIC code 287) and the Chemicals and Allied Products major group (28). The two tables present the data aggregated by two-digit major groups.

Only manufacturing facilities in major SIC groups 20 through 39 are presently required by law to report to TRI. In addition, Presidential Executive Order 12856 requires all federal facilities to report to TRI.

TRI reporting forms allow facilities to report more than one SIC code to fully characterize their operations. Facilities that reported two or more two-digit SIC codes (major groups) within the manufacturing range of 20-39 [for example, petroleum (29) and chemicals (28)] are assigned to a "multiple codes" category. Facilities reporting no SIC code or SIC codes outside the 20-39 range are assigned to a "no codes" category. Federal facilities may fall in a variety of SIC code groupings, both within and outside of the manufacturing SIC code range. In fact, many federal facilities do not conduct any manufacturing activities. In Tables 4-10 and 4-11, federal facility data are included under the SIC code they reported or under the "multiple codes" or "no codes" categories, as appropriate.

Industry groups with the largest quantities of on-site TRI releases in 1995 were chemicals (787.8 million pounds), primary metals (331.2 million pounds), and paper (233.2 million pounds). TRI facilities also submitted 5,207 forms that indicated multiple SIC code combinations. These forms contained information on 149.7 million pounds of total releases, the fourth-largest total for any industry group.

Table 4-10. TRI Releases by Industry, 1995.

SIC Code	Industry	Facilities[6] Number	Total Forms Number	Form As Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
20	Food	2,019	3,603	926	74,007,718	6,358,763	23,010	5,623,373	86,012,864
21	Tobacco	24	49	0	1,737,376	10,105	0	135	1,747,616
22	Textiles	356	736	51	17,489,856	268,850	0	6,903	17,765,609
23	Apparel	23	45	1	1,258,927	5	0	250	1,259,182
24	Lumber	719	1,839	362	31,211,454	66,784	0	10,970	31,289,208
25	Furniture	508	1,458	41	40,950,724	872	0	9,608	40,961,204
26	Paper	487	2,344	94	212,884,480	16,919,282	220	3,421,232	233,225,214
27	Printing	273	534	12	31,606,383	14,372	0	4,600	31,625,355
28	Chemicals	3,871	21,493	2,527	407,363,052	88,084,777	230,313,442	61,990,939	787,752,210
29	Petroleum	400	3,244	220	53,237,132	4,140,171	2,223,453	342,677	59,943,433
30	Plastics	1,821	3,791	273	111,638,343	152,088	5	428,541	112,218,977
31	Leather	97	249	20	2,941,286	113,360	0	14,843	3,069,489
32	Stone/Clay/Glass	625	1,606	213	34,633,269	117,731	102,063	1,189,405	36,042,468
33	Primary Metals	1,881	6,424	382	137,588,078	8,238,266	181,974	185,191,484	331,199,802
34	Fabricated Metals	2,918	7,765	408	81,438,563	394,468	931	751,520	82,585,482
35	Machinery	1,065	2,814	135	22,983,690	27,354	0	148,425	23,159,469
36	Electrical Equip.	1,250	3,281	103	29,744,174	384,391	5	360,076	30,488,646
37	Transportation Equip.	1,270	4,482	158	109,346,838	275,007	0	395,888	110,017,733
38	Measure./Photo.	306	763	41	16,212,842	647,407	0	5,766	16,866,015
39	Miscellaneous	359	792	46	11,433,809	1,505	0	14,492	11,449,806
	Multiple codes 20-39[7]	1,445	5,207	377	124,419,660	9,591,944	1,808,850	13,831,264	149,651,718
	No codes 20-39[8]	234	792	47	8,194,459	508,122	325,756	1,389,574	10,417,911
	Total	21,951	73,311	6,437	1,562,322,113	136,315,624	234,979,709	275,131,965	2,208,749,411

The chemical industry accounted for 17.6% of all facilities reporting to TRI, 29.3% of all forms filed, and 35.7% of all releases. Chemical manufacturing facilities reported an average of 203,501 pounds of releases, the second-highest rate among all industry groups. In 1995, this industry accounted for a quarter of all reported air emissions (26.1%), two thirds of surface water discharges (64.6%), and almost all of the reported underground injection of waste (98.0%).

The primary metals industry accounted for 8.6% of all facilities and 8.8% of all forms; however, this industry accounted for 15.0% of releases. The primary metals industry reported an average of 176,076 pounds of releases per facility, the third highest rate among all industry groups. This industry accounted for two thirds (67.3%) of all land releases reported in 1995.

Facilities in the paper industry reported releasing an average of 478,902 pounds of TRI chemicals in 1995, highest of all industry groups. This industry accounted for just 2.2% of all facilities and 3.2% of all forms, yet

[6] Facilities have been assigned to the "multiple" category according to all the SIC codes they reported. Forms and amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for an individual chemical form from the facility.

[7] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

[8] Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

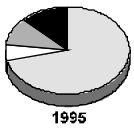


Table 4-11. TRI Transfers by Industry, 1995.

SIC Code	Industry	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[9] Pounds	Total Transfers Pounds
20	Food	1,105,035	191,257	982,058	22,456,381	699,107	2,448	25,436,286
21	Tobacco	100,961	1,000	6,591	364,295	269,215	0	742,062
22	Textiles	797,741	2,071,309	731,324	2,815,809	581,734	0	6,997,917
23	Apparel	3,021	106,707	60,300	255	27,842	0	198,125
24	Lumber	446,362	2,645,651	524,510	29,720	2,869,387	2,418	6,518,048
25	Furniture	6,525,939	6,928,460	796,220	122,438	107,145	250	14,480,452
26	Paper	5,286,545	8,426,010	8,968,890	41,992,057	3,017,880	500	67,691,882
27	Printing	5,575,594	3,750,132	418,855	255,642	52,645	3,866	10,056,734
28	Chemicals	241,023,104	405,325,944	160,192,339	115,287,232	29,729,498	128,629	951,686,746
29	Petroleum	22,941,629	552,946	1,066,499	5,442,553	3,185,648	1	33,189,276
30	Plastics	19,278,629	7,465,728	3,261,774	2,675,590	11,755,589	48,226	44,485,536
31	Leather	440,743	268,536	11,587	1,266,405	1,439,975	0	3,427,246
32	Stone/Clay/Glass	3,119,009	3,283,287	2,279,958	842,722	6,031,690	250	15,556,916
33	Primary Metals	767,649,333	3,792,004	37,474,772	6,550,392	169,394,346	2,092,032	986,952,879
34	Fabricated Metals	312,593,205	14,317,979	11,994,161	5,576,081	13,078,284	65,474	357,625,184
35	Machinery	62,186,201	3,104,826	1,703,448	2,772,332	3,298,363	20,055	73,085,225
36	Electrical Equip.	377,488,402	11,019,350	8,413,162	9,194,676	9,866,503	34,335	416,016,428
37	Transportation Equip.	162,505,961	15,389,751	10,962,646	4,937,714	10,574,766	29,466	204,400,304
38	Measure./Photo.	14,405,710	2,330,194	3,712,513	768,943	801,905	0	22,019,265
39	Miscellaneous	18,947,120	2,891,485	591,612	846,019	2,048,394	2,140	25,326,770
	Multiple codes 20-39[10]	188,139,510	16,722,769	31,845,959	15,021,188	9,827,014	970	261,557,410
	No codes 20-39[11]	3,171,635	1,444,401	1,577,685	618,072	565,467	0	7,377,260
	Total	2,213,731,389	512,029,726	287,576,863	239,836,516	279,222,397	2,431,060	3,534,827,951

reported 10.6% of all releases in 1995. Nearly all (91.3%) of the paper industry's releases in 1995 were in the form of air emissions.

Other industries averaging more than 100,000 pounds of releases per facility were petroleum (149,859 pounds), printing (115,844 pounds), and facilities reporting multiple SIC codes (103,565 pounds). In contrast, facilities in the fabricated metals, electrical equipment, and machinery industries all reported average releases of less than 30,000 pounds per facility.

The industries with the largest quantities of transfers of TRI chemicals in 1995 were primary metals (987.0 million pounds), chemicals (951.7 million pounds), and electrical equipment (416.0 million pounds). Most of the transfers reported by the primary metals and electrical equipment industries were sent to recycling (77.8% and 90.7%, respectively). In contrast, only 25.3% of the chemical industry's transfers went to recycling; another 42.6% was sent for energy recovery. The chemical industry accounted for 79.2% of all transfers to energy recovery.

[9] Transfers reported without valid waste management codes.
[10] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
[11] Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

Table 4-12. TRI Releases of Newly Added Chemicals Compared to Other TRI Chemicals, by Industry, 1995.

SIC Code	Industry	Newly Added Chemicals Pounds	All TRI Chemicals Pounds	Newly Added as Percent of All TRI Chemicals Percent
20	Food	56,665,545	86,012,864	65.9
21	Tobacco	370,271	1,747,616	21.2
22	Textiles	866,025	17,765,609	4.9
23	Apparel	13,177	1,259,182	1.0
24	Lumber	133,959	31,289,208	0.4
25	Furniture	246,449	40,961,204	0.6
26	Paper	8,918,722	233,225,214	3.8
27	Printing	216,675	31,625,355	0.7
28	Chemicals	129,221,186	787,752,210	16.4
29	Petroleum	8,613,162	59,943,433	14.4
30	Plastics	4,508,861	112,218,977	4.0
31	Leather	206,619	3,069,489	6.7
32	Stone/Clay/Glass	185,003	36,042,468	0.5
33	Primary Metals	9,044,134	331,199,802	2.7
34	Fabricated Metals	2,191,940	82,585,482	2.7
35	Machinery	234,350	23,159,469	1.0
36	Electrical Equip.	2,226,575	30,488,646	7.3
37	Transportation Equip.	1,251,026	110,017,733	1.1
38	Measure./Photo.	653,957	16,866,015	3.9
39	Miscellaneous	79,466	11,449,806	0.7
Multiple codes 20-39[12]		11,455,141	149,651,718	7.7
No codes 20-39[13]		420,327	10,417,911	4.0
Total		237,722,570	2,208,749,411	10.8

Newly Reportable Chemicals, by Industry

As shown on Table 4-12, the chemical industry reported the greatest total releases of new chemicals (129.2 million pounds), which represented 16.4% of its releases of all TRI chemicals. In contrast, the new chemicals accounted for two thirds (65.9%) of the releases reported by the food industry (56.7 million pounds for the added chemicals, out of 86.0 million pounds for all TRI chemicals). Without the new chemicals, the food industry would rank 13th for total releases; with the new reporting, this industry ranks second.

Although the chemical industry ranked second among industries for total transfers, it reported the greatest amount of transfers of the new chemicals: 84.3 million pounds, or 54.4% of all transfers of added chemicals (see Table 4-13). Facilities reporting multiple SIC codes (explained in the industry section, above) transferred 22.0 million pounds of the new chemicals off-site and those in the primary metals industry 12.4 million pounds, second and third among industries, respectively. Reporting of the new chemicals did not generally affect industry rankings for total transfers in 1995, because of the relatively larger amounts of previously reportable TRI chemicals involved.

[12] Facilities/forms that reported more than one 2-digit SIC code within the range of 20-39 [e.g., paper (26) and chemicals (28)].
[13] Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

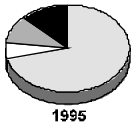


Table 4-13. TRI Transfers of Newly Added Chemicals Compared to Other TRI Chemicals, by Industry, 1995.

SIC Code	Industry	Newly Added Chemicals Pounds	All TRI Chemicals Pounds	Newly Added As Percent of All TRI Chemicals Percent
20	Food	3,843,692	25,436,286	15.1
21	Tobacco	629,441	742,062	84.8
22	Textiles	498,858	6,997,917	7.1
23	Apparel	3,080	198,125	1.6
24	Lumber	468	6,518,048	0.0
25	Furniture	45,575	14,480,452	0.3
26	Paper	760,000	67,691,882	1.1
27	Printing	133,917	10,056,734	1.3
28	Chemicals	84,338,462	951,686,746	8.9
29	Petroleum	174,164	33,189,276	0.5
30	Plastics	3,294,311	44,485,536	7.4
31	Leather	31,413	3,427,246	0.9
32	Stone/Clay/Glass	63,138	15,556,916	0.4
33	Primary Metals	12,365,553	986,952,879	1.3
34	Fabricated Metals	3,279,362	357,625,184	0.9
35	Machinery	2,430,687	73,085,225	3.3
36	Electrical Equip.	10,759,457	416,016,428	2.6
37	Transportation Equip.	8,936,417	204,400,304	4.4
38	Measure./Photo.	826,267	22,019,265	3.8
39	Miscellaneous	399,516	25,326,770	1.6
Multiple codes 20-39[14]		21,957,850	261,557,410	8.4
No codes 20-39[15]		316,763	7,377,260	4.3
Total		155,088,391	3,534,827,951	4.4

1995 TRI Data by Federal Facilities

This is the second year that federal facilities have reported to TRI. In 1993, President Clinton issued Executive Order (E.O.) 12856 which mandated that federal facilities report to TRI, starting with the 1994 reporting year. The goal of E.O. 12856 is to extend community right-to-know to the federal government. In addition to filing TRI reports, Executive Order 12856 also instructs federal facilities to meet the other requirements of the Emergency Planning and Community Right-to-Know Act (EPCRA).

E.O. 12856 further stipulates that each federal agency use the 1994 TRI data submitted by their facilities as a baseline for achieving an agency-wide 50% reduction by 1999. Each federal agency is responsible for working with their respective federal facilities to reach this goal. In an effort to foster pollution prevention, E.O. 12856 encourages federal facilities to use source reduction wherever practicable to achieve their reductions.

While most federal facilities began reporting to TRI in 1994, some federal facilities submitted TRI reports earlier. For the Department of Energy (DOE), for instance, 1995 is actually the

[14] Facilities/forms that reported more than one 2-digit SIC code within the range of 20-39 [e.g., paper (26) and chemicals (28)].
[15] Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

Table 4-14. TRI Releases from Federal Facilities, 1995.

1995 Releases	Pounds
Total Releases	7,926,982
Fugitive Air	2,843,691
Point Source Air	3,192,332
Surface Water	507,036
Underground Injection	325,756
On-site Land Releases	1,058,167

Table 4-15. TRI Transfers from Federal Facilities, 1995.

1995 Transfers	Pounds
Total Transfers	6,495,255
Transfers to Recycling	4,220,029
Transfers to Energy Recovery	451,092
Transfers to Treatment	970,659
Transfers to POTWs	112,067
Transfers to Disposal	741,408
Other Off-site Transfers[16]	0

third reporting year. In the spirit of community right-to-know, DOE instructed its facilities to begin filing TRI reports for the 1993 reporting year, a year prior to the date mandated under Executive Order 12856.

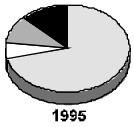
For the 1995 reporting year, 144 federal facilities submitted 433 TRI reports. These facilities represented 13 federal agencies. As Table 4-14 shows, the total releases from federal facilities totaled about 7.9 million pounds. Off-site transfers equaled 6.5 million pounds (see Table 4-15).

Like the rest of the reporting community, federal facilities reported that a majority of their releases were to the air. Fugitive and stack air together equaled 76.1% of the total releases. For

Table 4-16. TRI Releases from Federal Facilities, by Federal Agency, 1995.

Federal Agency	Facilities Number	Total Forms Number	Form As Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Dept. of Agriculture	3	4	0	10	0	0	474,920	474,930
Dept. of Defense	94	302	9	4,626,824	477,885	5	510,641	5,615,355
Air Force	26	85	4	2,979,038	186,295	5	486,507	3,651,845
Army	34	120	1	631,249	281,736	0	4,624	917,609
Army Corps of Engineers	2	3	0	3,110	255	0	19,000	22,365
Defense Logistics Agency	2	6	0	5,101	0	0	250	5,351
Marines	9	31	0	374,988	47	0	3	375,038
Navy	21	57	4	633,338	9,552	0	257	643,147
Dept. of Energy	18	54	0	203,097	10,782	325,751	42,261	581,891
Dept. of Health and Human Services	1	2	0	0	0	0	0	0
Dept. of Interior	3	5	2	750	4,086	0	0	4,836
Dept. of Justice	3	3	0	19,510	13,000	0	0	32,510
Dept. of Transportation	1	2	0	16,499	0	0	0	16,499
Dept. of Treasury	5	8	0	7,630	0	0	30,000	37,630
Dept. of Veterans Affairs	1	1	0	0	0	0	0	0
Environmental Protection Agency	1	2	0	11	0	0	0	11
National Aeronautics and Space Admin.	7	32	4	473,974	0	0	5	473,979
Tennessee Valley Authority	5	8	4	13,620	0	0	0	13,620
U.S. Enrichment Corporation	2	10	2	674,098	1,283	0	340	675,721
Total	144	433	21	6,036,023	507,036	325,756	1,058,167	7,926,982

[16] Transfers reported without valid waste management codes.



off-site transfers the reporting patterns of federal facilities differ from the private sector. The total amount that federal facilities reported for off-site transfers were 1.4 million pounds less than the total releases reported by federal facilities. For the private sector, however, total off-site transfers were much larger than total releases.

Analyzing the 1995 data by federal agency provides another picture of reporting patterns. The Department of Defense (DOD), for instance, had a total of 94 facilities submitting 302 TRI forms. The DOD facilities reported a total 5.6 million pounds of releases and 5.7 million pounds of off-site transfers (see Tables 4-16 and 4-17). These numbers translate to 70.8% and 87.7%, respectively, of the total releases and off-site transfers for federal facilities. A primary reason for both the large number of facilities and the amount of releases and transfers relates to the unique function of DOD. Facility activities range from the manufacture of munitions to the chemical-intensive cleaning of airplane, tank and sea-going vessel parts.

The Department of Energy (DOE) was the next largest agency. Eighteen DOE facilities submitted 54 TRI forms. Total 1995 releases for DOE were 582,000 pounds, representing 7.3% of the total for the federal government. The 103,000 pounds transferred off-site from DOE facilities equals 1.6% of the amount for the federal government. Like DOD, DOE facilities were involved in activities that utilize a number of the reportable toxic chemicals, with the principle function at DOE facilities being the research and development and cleanup of contamination from nuclear weapons production.

With only two reporting facilities and 10 TRI submissions, the U.S. Enrichment Corp. was the agency with the third greatest amount of releases and transfers. Total releases for the two

Table 4-17. TRI Transfers from Federal Facilities, by Federal Agency, 1995.

Federal Agency	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[17] Pounds	Total Transfers Pounds
Dept. of Agriculture	0	0	0	0	0	0	0
Dept. of Defense	3,605,124	430,162	945,827	20,552	692,429	0	5,694,094
Air Force	497,520	125,177	147,464	1,311	293,494	0	1,064,966
Army	2,691,579	128,874	653,154	1,621	197,482	0	3,672,710
Army Corps of Engineers	0	0	0	325	0	0	325
Defense Logistics Agency	0	0	2,287	0	505	0	2,792
Marines	276,165	36,800	81,501	1,275	164,849	0	560,590
Navy	139,860	139,311	61,421	16,020	36,099	0	392,711
Dept. of Energy	93,535	0	7,020	0	2,501	0	103,056
Dept. of Health and Human Services	54,509	0	603	0	0	0	55,112
Dept. of Interior	20,979	0	4,852	0	0	0	25,831
Dept. of Justice	0	0	0	0	0	0	0
Dept. of Transportation	0	1,517	282	0	4,544	0	6,343
Dept. of Treasury	414,213	0	0	515	27,000	0	441,728
Dept. of Veterans Affairs	0	0	0	91,000	0	0	91,000
Environmental Protection Agency	0	0	0	0	0	0	0
National Aeronautics and Space Admin.	31,669	19,413	12,075	0	14,934	0	78,091
Tennessee Valley Authority	0	0	0	0	0	0	0
U.S. Enrichment Corporation	0	0	0	0	0	0	0
Total	4,220,029	451,092	970,659	112,067	741,408	0	6,495,255

[17] Transfers reported without valid waste management codes.

USEC facilities was 676,000, with no reported off-site transfers. This amount was just below the total releases and transfers reported by DOE facilities. The primary role of the USEC facilities is to process uranium. Once a part of DOE, Congress in 1993 created the USEC as part of an effort to privatize sectors of government activities. While presently in transition to the private sector, the USEC facilities are continuing to report as federal facilities.

1995 TRI DATA BY CHEMICAL

This section presents chemical-specific TRI data for 1995, including information for chemicals newly added for the 1995 reporting year. It also reviews data for two groups of TRI chemicals: metals and chemicals identified as known or suspected carcinogens. Also included is information about the uses, toxicity, and environmental fate of the TRI chemicals with the largest reported releases. At the end of this chapter, Table 4-33 presents release and transfer data for all TRI chemicals for which 1995 reports were received (followed by a table of waste management data for all reported chemicals).

TRI Chemical Expansion in the 1995 Reporting Year

A number of the chemicals among the 286 added for the 1995 reporting year represent chemicals with high releases. Table 4-18 identifies the 20 newly added chemicals with the greatest reported releases in 1995, totalling 236.6 million pounds. Together, they account for almost all releases of the newly added chemicals (99.5%).

Releases of nitrate compounds totaled 137.7 million pounds in 1995, more than any other new TRI chemical. Almost two-thirds of the releases of nitrate compounds (88.5 million pounds) are discharged to surface waters. Such discharges represent 98.4% of surface water discharges of the newly added chemicals and 64.9% of surface water discharges of all TRI chemicals.

In nitrogen-limited waters, nitrates from nitrate compounds have the potential to cause increased algal growth leading to eutrophication in the aquatic environment. (Nitrate-nitrogen is the form of nitrogen most available to plants.) Studies of estuarine water at several locations along the eastern coast of the US have indicated that low concentrations of dissolved nitrogen (e.g., nitrate) limit primary production of plants. Additions of nitrate to such estuarine systems stimulate primary production of plants and can produce changes in the dominant species of plants, leading to cultural eutrophication and ultimately to deterioration of water quality, including algal blooms. Toxic effects result from oxygen depletion as the algae die and decay. Toxic effects have also been related to the release of decay products or direct excretion of toxic substances from sources such as blue-green algae.

N-Hexane was the chemical with the second largest releases among the newly added chemicals. Almost all releases of n-hexane were reported as air emissions (77.3 million pounds), and they represent 86.4% of the total air emissions of the newly added TRI chemicals and 3.4% of the total air emissions of all TRI chemicals. EPA has concluded that n-hexane can reasonably be anticipated to cause neurological effects. Studies of workers have shown neurological effects such as blurred vision, abnormal color vision, loss of coordination, and numbness of the extremities. N-hexane has been shown to damage the peripheral nerve cells which are the nerve cells that run from the spinal cord to other parts of the body.

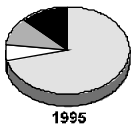


Table 4-18. Top 20 TRI Chemicals with the Largest Releases, among Newly Added Chemicals, 1995.

CAS Number[18]	Chemical	Total Forms Number	Form As Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
—	Nitrate compounds	649	37	15,932	227,510	88,495,829	46,299,521	2,704,310	137,743,102
110-54-3	n-Hexane	676	18	23,071,340	54,262,867	46,418	5,380	10,157	77,396,162
68-12-2	N,N-Dimethylformamide	134	7	564,526	2,278,664	73,106	1,099,000	1,710	4,017,006
108-93-0	Cyclohexanol	24	5	63,513	106,655	154	3,623,000	0	3,793,322
872-50-4	N-Methyl-2-pyrrolidone	253	11	1,214,106	1,412,926	201,221	769,037	135,050	3,732,340
121-44-8	Triethylamine	143	20	471,422	1,545,650	27,685	309,512	14,010	2,368,279
7632-00-0	Sodium nitrite	289	62	79,292	143,121	1,082,902	978,500	80,798	2,364,613
—	Polycyclic aromatic compounds	138	7	80,920	603,381	4,915	0	14,164	703,380
1912-24-9	Atrazine	20	3	3,468	19,221	1,656	0	637,036	661,381
10028-15-6	Ozone	26	1	41,779	489,392	0	0	0	531,171
124-40-3	Dimethylamine	69	15	126,998	327,891	24,985	45,250	3,000	528,124
4170-30-3	Crotonaldehyde	7	0	38,569	63,010	680	391,500	0	493,759
—	Diisocyanates	996	272	158,719	226,662	1,370	0	29,032	415,783
—	Nicotine and salts	24	1	26,297	351,686	755	0	135	378,873
2699-79-8	Sulfuryl fluoride	2	0	7	355,000	0	0	0	355,007
77-73-6	Dicyclopentadiene	63	3	169,168	155,133	5,468	0	331	330,100
107-19-7	Propargyl alcohol	11	1	1,650	8,229	0	290,680	0	300,559
13194-48-4	Ethoprop	6	0	250	256	0	0	174,290	174,796
75-43-4	Dichlorofluoromethane (HCFC-21)	4	0	43,117	130,000	2	0	0	173,119
149-30-4	2-Mercaptobenzothiazole	26	7	1,782	32,916	5	97,000	260	131,963
	Subtotal	3,560	470	26,172,855	62,740,170	89,967,151	53,908,380	3,804,283	236,592,839
	Total for Chemicals Added in 1995	4,410	658	26,370,105	63,104,521	90,243,306	54,116,863	3,887,775	237,722,570
	Total for All TRI Chemicals	73,311	6,437	385,094,609	1,177,227,504	136,315,624	234,979,709	275,131,965	2,208,749,411

Ozone, also among the top 20 of the newly added chemicals, with 531,000 pounds of air releases, is the subject of recently proposed revisions to air quality standards. EPA has proposed revisions to the air quality standards for ozone due to compelling evidence that this chemical adversely affects human health, and especially the health of children, at levels lower than previously considered. EPA proposed to change this regulation to a new 8 hour standard to protect against longer exposure periods that are of concern at ozone concentration below the level of the current standard. Exposure to ambient ozone concentrations has been linked to increased hospital admissions for respiratory causes, such as asthma. Studies conducted in the northeastern US and Canada show that ozone air pollution is associated with 10-20% of all of the summertime respiratory-related hospital admissions. Repeated exposure to ozone can make people more susceptible to respiratory infection and lung inflammation and can aggravate preexisting respiratory diseases, such as asthma.

Adults who are outdoors and are moderately active during the summer months, such as construction workers and other outdoor workers, are also among those most at risk. These individuals, as well as those with respiratory illnesses, such as asthma, can experience a reduction in lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion. Long-term exposures to ozone can cause repeated inflammation of the lung, impairment

[18] Compound categories do not have CAS numbers (—).

of lung defense mechanisms, and irreversible changes in lung structure, which could lead to chronic respiratory illnesses such as emphysema, chronic bronchitis, and or premature aging of the lungs. Also, children are most at risk from exposure to ozone because they are active outside, playing and exercising during the summertime when ozone levels are highest.

TRI information collected on releases of ozone to the environment involve industrial releases of the chemical, not non-manufacturing releases from, for example, automobiles which comprise a greater source of ozone to the environment. However, the information provided through EPCRA section 313 adds to the total picture of ozone in the environment.

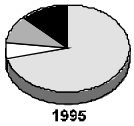
Newly Added Chemicals Affecting Children's Health

The chemicals added to the TRI beginning with the 1995 reporting year include chemicals that may have adverse effects for children, such as chemicals that have been linked to developmental toxicity, as well as known respiratory effects. The quality of our children's health and the threat posed by environmental hazards has clearly become of great concern to the public recently. EPA has outlined several reasons why children are particularly vulnerable to environmental health risks. These vulnerabilities include: children's systems are still developing so they eat proportionally more food than adults; children are least able to protect themselves; and their behavior exposes them to different environmental hazards. As a consequence, this group represents a greater concern than the general public to toxic chemical exposure.

Nitrate compounds, the chemical category added to the TRI list for the 1995 reporting year with the greatest releases, captures nitrates which have been linked to infantile methemoglobinemia, or 'blue-baby' syndrome. This condition, which occurs in human infants exposed to aqueous solutions of nitrate ion and which can cause damage to developing organs and death, is caused by the reduced capacity for the blood to carry oxygen. Infants 0-3 months of age are the most sensitive population to nitrate-induced methemoglobinemia. This is primarily due to their higher stomach pH which favors the growth of nitrate-reducing bacteria, the immaturity of their metabolic enzyme systems, and reduced capacity of their erythrocytes to reduce methemoglobin to hemoglobin. Information concerning this chemical is important to a family's right-to-know.

Other chemicals such as bromoxynil, oxydiazon, and triforine, all added in the chemical expansion for the 1995 reporting year, have been shown to cause structural abnormalities, nonviable births, and decreased birth weights in animal studies. Almost one third of the newly added chemicals are developmental toxicants. The total releases of these chemicals was 10.6 million pounds in 1995, or 4.5% of the total releases for all of the newly added chemicals.

EPA has also noted that there are special concerns relating to children's exposure to ozone. Children are most at risk from exposure to ozone because: children breathe more air per pound of body weight than adults; children are more susceptible than adults to environmental threats because of their developing respiratory systems; and, children are outside most during the summer, when the ozone levels are the highest. Also, because asthma is growing concern in children, additional factors must be taken into account in understanding ozone exposure of asthmatic children. Concern has grown recently because children are 25% of the population and comprise 40% of the asthma cases; the asthma death rate is three times as great as 20 years ago; African-Americans die from asthma at a rate six times that of Caucasians; and, ozone aggravates asthma, increasing



use of medication, more medical treatment, and more visits to emergency clinics.

Chemicals Used as Pesticides

About half of the newly added chemicals are pesticides; the total releases for these chemicals were 2.0 million pounds and transfers were 3.2 million pounds. The TRI information, in concert with efforts made by EPA through the Food Quality Protection Act, can provide the public with a more complete picture of toxic chemicals used as pesticides. Toxic chemicals used as pesticides have a wide range of effects associated with exposure at certain levels. Although TRI reporting reflects manufacturing releases of chemicals used as pesticides and not direct pesticide use, TRI information is still valuable in presenting a fuller picture of pesticides in the environment.

Chemicals Added Because of Carcinogenicity

Almost 15% of the newly added chemicals were added to the TRI list based on EPA's evaluation of their carcinogenicity. Total releases of these chemicals were 1.9 million pounds. This is a different set from those newly added chemicals that are OSHA-designated carcinogens, whose total releases were 5.4 million pounds (see Table 4-22 and discussion of OSHA carcinogens later in this chapter). Cancer-causing agents in the environment are an obvious source of concern to the public. The reporting of information about these chemicals adds significantly to community right-to-know.

Newly reportable chemicals are specially marked in Table 4-33, which supplies release and transfer data for all TRI chemicals.

Chemical-Specific Data Tables for All TRI Chemicals

Table 4-19 lists the top 20 chemicals—among all TRI chemicals—with the largest total releases. Facilities reported releasing more than 100 million pounds of four chemicals: methanol, 245.0 million pounds; ammonia, 195.1 million pounds; toluene, 145.9 million pounds, and nitrate compounds, 137.7 million pounds. For the first three of these chemicals, the primary release medium was air. As mentioned above, nitrate compounds, newly reportable in 1995, were the chemical reported as discharged to water (88.5 million pounds) and to underground wells (46.3 million pounds) in greater amounts than any other TRI chemical. Zinc compounds led the TRI list for reported releases to land (81.5 million pounds).

When only releases to air, water, and land are considered (excluding underground injection), the top 18 chemicals remain the same, although a few change rank by one position.

Use, Toxicity, and Environmental Fate Information

TRI chemicals exhibit a variety of adverse health and environmental effects. Information on use, toxicity, and environmental fate is provided here for the top five chemicals with the largest releases in 1995 (see Table 4-19).

Methanol

Uses. Methanol is used as a solvent, as a raw material in the synthesis of organic chemicals, as a fuel, as a de-icing agent, and to denature ethanol.

Toxicity. Methanol is readily absorbed from the gastrointestinal tract and the respiratory tract, and is toxic to humans in moderate to high doses. In the body, methanol is converted into formaldehyde and formic acid. Observed toxic effects at high dose levels include central nervous system damage and blindness. Inhalation of methanol at relatively high doses affects the liver and blood in animals.

Table 4-19. Top 20 TRI Chemicals with the Largest Total Releases, 1995.

CAS Number[19]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
67-56-1	Methanol	30,910,899	179,265,280	8,378,058	24,812,653	1,645,466	245,012,356
7664-41-7	Ammonia	36,740,310	120,018,952	9,994,144	23,205,946	5,137,094	195,096,446
108-88-3	Toluene	52,017,387	93,446,998	53,287	303,491	66,306	145,887,469
—	Nitrate compounds	15,932	227,510	88,495,829	46,299,521	2,704,310	137,743,102
1330-20-7	Xylene (mixed isomers)	22,439,619	73,072,799	33,806	93,396	100,323	95,739,943
—	Zinc compounds	1,851,792	2,912,569	1,129,803	212,844	81,541,683	87,648,691
7647-01-0	Hydrochloric acid[20]	2,571,395	75,344,797	7,286	7,382,957	24,097	85,330,532
75-15-0	Carbon disulfide	3,460,693	80,664,956	39,864	3,985	265	84,169,763
110-54-3	n-Hexane	23,071,340	54,262,867	46,418	5,380	10,157	77,396,162
78-93-3	Methyl ethyl ketone	24,861,372	44,485,984	63,120	556,607	87,856	70,054,939
7782-50-5	Chlorine	1,050,520	64,688,063	428,976	74,124	14,213	66,255,896
7664-38-2	Phosphoric acid	440,282	823,010	20,402,696	7,560	35,884,482	57,558,030
75-09-2	Dichloromethane	22,188,420	33,930,771	28,370	1,140,335	2,064	57,289,960
—	Manganese compounds	703,340	2,121,478	822,341	3,590	41,326,472	44,977,221
—	Glycol ethers	9,158,796	34,386,882	176,051	132,064	25,145	43,878,938
—	Copper compounds	1,496,420	1,183,482	79,792	264,102	40,604,659	43,628,455
100-42-5	Styrene	12,115,785	29,359,298	17,570	209,945	171,010	41,873,608
74-85-1	Ethylene	14,291,229	19,827,406	27,324	0	0	34,145,959
75-05-8	Acetonitrile	698,612	323,270	7,474	27,837,181	12	28,866,549
71-36-3	n-Butyl alcohol	5,489,259	19,876,273	115,353	2,263,357	4,631	27,748,873
	Subtotal	265,573,402	930,222,645	130,347,562	134,809,038	209,350,245	1,670,302,892
	Total for All TRI Chemicals	385,094,609	1,177,227,504	136,315,624	234,979,709	275,131,965	2,208,749,411

Methanol is expected to have low toxicity to aquatic organisms and is not likely to persist in water or to bioaccumulate in aquatic life.

Environmental Fate. Methanol reacts in air to produce formaldehyde, which contributes to formation of air pollutants. In the atmosphere, it can react with other chemicals or be washed out by rain. Methanol is readily degraded by microorganisms in soils and surface waters.

Ammonia

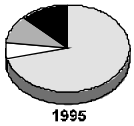
Uses. Ammonia is used in the manufacture of nitrogen compounds, including chemicals used as fertilizers or in making nylon and plastics. It is also used in refrigeration, paper and pulp production, explosives, cleaners, and metal-treating operations.

Toxicity. Anhydrous ammonia is a corrosive and severely irritating gas with a pungent odor; it is irritating to the skin, eyes, nose, throat, and upper respiratory system.

Aqueous ammonia is moderately toxic to aquatic organisms. Because it is a source of nitrogen, an essential element for aquatic plant growth, ammonia may contribute to eutrophication of standing or slow-moving surface water, particularly in nitrogen-limited waters, such as the Chesapeake Bay.

[19] Compound categories do not have CAS numbers (—).

[20] Effective with the 1995 reporting year, the listing for hydrochloric acid was modified to include only acid aerosol forms. Reported releases of hydrochloric acid to water, land, and underground injection are unlikely to be acid aerosol forms and therefore probably represent misreporting. The definition change is described in Chapter 5.



Environmental Fate. Ammonia combines with sulfate ions in the atmosphere and is washed out by rainfall, resulting in rapid return of ammonia to the soil and surface waters. Ammonia is a central compound in the environmental cycling of nitrogen. Ammonia in lakes, rivers, and streams is converted to nitrate.

Toluene

Uses. Toluene is a flammable liquid used in the manufacture of organic chemicals, as a solvent for paint, gums, and resins, and as an additive for gasoline.

Toxicity. Inhalation or ingestion of toluene can cause headaches, confusion, weakness, and memory loss. Toluene may also affect the way the kidneys and liver function. Some studies have shown that unborn animals were harmed when high levels of toluene were inhaled by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene.

Reactions of toluene in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Environmental Fate. As a volatile organic chemical, toluene will react with other atmospheric components in the lower atmosphere, contributing to the formation of ozone and other air pollutants. The majority of releases to land and water will evaporate. Toluene may also be degraded by microorganisms.

Nitrate Compounds

Uses. There are many compounds covered by the nitrate compounds category and they have many uses. The most significant use is as fertilizers, either straight or blended to make complex fertilizers. Some compounds are also used as oxidizing agents and as constituents in some explosives and pyrotechnics. Nitrate compounds are also used as refining agents for removing air bubbles from melts in the glass and enamel industry and in metallurgy as heat-transfer baths for quench hardening and tempering of steel, light alloys, and copper alloys.

Toxicity. Nitrate compounds that are soluble in water release nitrate ion which can cause both human health and environmental effects. Human infants exposed to aqueous solutions of nitrate ion can develop a condition in which the blood's ability to carry oxygen is reduced. This reduced supply of oxygen can led to damaged organs and death. Because it is a source of nitrogen, an essential element for aquatic plant growth, nitrate ion may contribute to eutrophication of standing or slow-moving surface water, particularly in nitrogen-limited waters, such as the Chesapeake Bay.

Environmental Fate. Nitrate-nitrogen is the form of nitrogen most available to plants. In the environment, nitrate ion is taken up by plants and becomes part of the natural nitrogen cycle. Excess nitrate can stimulate primary production of plants and can produce changes in the dominant species of plants, leading to cultural eutrophication and ultimately to deterioration of water quality.

Xylenes

Uses. Xylenes are used in the manufacture of organic chemicals as a raw material and as a solvent. They are also used as solvents for paints, coatings, adhesives, and rubbers.

Toxicity. Xylenes are rapidly absorbed into the body after inhalation, ingestion, or skin contact. Short-term exposure to high levels of xylenes can cause irritation of the skin, eyes, nose, and throat, difficulty in breathing, impaired lung

Table 4-20. TRI Releases of Metals and Metal Compounds, 1995.

Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Antimony and antimony compounds	44,017	88,296	35,938	11,332	1,186,117	1,365,700
Arsenic and arsenic compounds	71,451	60,222	5,235	55,000	1,352,453	1,544,361
Barium and barium compounds	95,299	151,459	59,896	0	534,373	841,027
Beryllium and beryllium compounds	3	1,192	28	0	45,189	46,412
Cadmium and cadmium compounds	10,340	42,712	1,108	109	69,057	123,326
Chromium and chromium compounds	446,601	751,383	152,615	57,780	21,652,821	23,061,200
Cobalt and cobalt compounds	17,628	43,006	87,683	22,657	228,751	399,725
Copper and copper compounds	1,948,194	1,908,210	121,903	293,889	42,284,834	46,557,030
Lead and lead compounds	735,144	1,297,578	64,753	912	14,683,521	16,781,908
Manganese and manganese compounds	1,162,724	2,348,450	938,857	3,607	49,656,794	54,110,432
Mercury and mercury compounds	10,698	5,613	328	6	1,016	17,661
Nickel and nickel compounds	253,843	336,794	76,732	113,506	2,662,954	3,443,829
Selenium and selenium compounds	2,656	69,997	2,276	3,640	110,273	188,842
Silver and silver compounds	8,500	16,702	6,445	380	30,675	62,702
Thallium and thallium compounds	5	250	0	0	755	1,010
Zinc and zinc compounds[21]	2,609,078	4,164,447	1,183,067	212,844	87,944,424	96,113,860
Total	7,416,181	11,286,311	2,736,864	775,662	222,444,007	244,659,025

function, impaired memory, and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations can cause headaches, dizziness, confusion, and lack of muscle coordination. Reactions of xylenes in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Environmental Fate. The majority of releases to land and water will quickly evaporate, although some degradation by microorganisms will occur. Xylenes are moderately mobile in soils and may leach into groundwater, where they may persist for several years. As volatile organic chemicals (VOCs), xylenes will react with other atmospheric components in the lower atmosphere, contributing to the formation of ozone and other air pollutants.

[21] Only fume and dust forms of zinc metal are reportable.

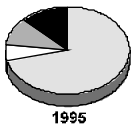


Table 4-21. TRI Transfers of Metals and Metal Compounds, 1995.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[22] Pounds	Total Transfers Pounds
Antimony and antimony compounds	8,857,241	50,871	889,683	113,130	3,127,826	10,835	13,049,586
Arsenic and arsenic compounds	613,700	3,402	1,341,873	316	1,388,214	0	3,347,505
Barium and barium compounds	1,856,005	91,968	1,546,043	385,227	4,788,921	250	8,668,414
Beryllium and beryllium compounds	33,623	0	1,413	1	8,543	0	43,580
Cadmium and cadmium compounds	1,793,320	2,866	197,957	4,194	1,704,559	46,535	3,749,431
Chromium and chromium compounds	123,811,523	179,718	5,522,176	358,500	20,699,615	32,955	150,604,487
Cobalt and cobalt compounds	11,303,443	1,864	104,752	24,903	452,506	0	11,887,468
Copper and copper compounds	697,197,036	77,748	3,164,652	327,461	20,901,980	52,146	721,721,023
Lead and lead compounds	351,135,515	68,930	7,520,913	58,334	19,016,274	1,258,520	379,058,486
Manganese and manganese compounds	125,706,803	196,886	5,270,818	401,124	33,392,707	521,070	165,489,408
Mercury and mercury compounds	58,206	505	16,739	24	208,075	871	284,420
Nickel and nickel compounds	100,382,663	7,189	2,016,960	179,866	8,556,131	1,271	111,144,080
Selenium and selenium compounds	162,882	19	50,593	2,564	73,970	0	290,028
Silver and silver compounds	2,275,830	1	28,781	2,201	10,889	0	2,317,702
Thallium and thallium compounds	3,852	0	190	5	0	0	4,047
Zinc and zinc compounds[23]	306,724,105	427,522	17,067,410	580,498	101,036,071	3,570	425,839,176
Total	1,731,915,747	1,109,489	44,740,953	2,438,348	215,366,281	1,928,023	1,997,498,841

Metals and Metal Compounds

Both metals and their metal compounds are listed on TRI. Releases and transfers reported in 1995 for these chemicals appear on Tables 4-20 and 4-21, respectively. Under EPCRA section 313, facilities that manufacture, process, or otherwise use metal compounds report releases and transfers of only the metal portion of the metal compound. For example, a facility that releases a copper compound, such as copper sulfate, would report as a release only the weight of the copper, not the weight of the entire copper compound. This is done to capture information on the targeted portion of each member of the category, so that information on the listed, or toxic, portion of the compound is captured.

Metals (including the metal portion of metal compounds) differ from other TRI chemicals because they do not degrade and are not destroyed. Other TRI-listed chemicals can be

[22] Transfers reported without valid waste management codes.
[23] Only fume and dust forms of zinc metal are reportable.

destroyed by sunlight, heat, microorganisms, or other chemicals. Although metals cannot be destroyed, they may be converted to a less toxic form. For example, many facilities convert hexavalent chromium (a known carcinogen) to the less toxic trivalent form before releasing or transferring it to off-site locations. Other metal waste may be treated before disposal so that the metal will be less likely to be transported through soils. Although such treatment may limit the availability of the metal to the environment, it does not destroy the metal.

Table 4-20 shows the releases of TRI metals and metal compounds in 1995, totalling 244.7 million pounds. Note that a few other metals [for example, aluminum (fume or dust) and certain metal-containing pesticides] are also reportable to TRI, but are not included in this table because they do not have associated compound categories. The large majority (90.9%) of releases of metals and metal compounds are land releases.

Table 4-21 shows the transfers of TRI metals and metal compounds in 1995, totaling nearly 2.0 billion pounds. This represents 56.5% of all transfers reported to TRI in 1995. Transfers of metals and metal compounds to recycling totaled 1.73 billion pounds, which represents 86.7% of all transfers of metals and metal compounds and nearly 77.2% of total releases and transfers of metals and metal compounds.

The metal recycling shown in Table 4-21 consists only of off-site recycling. Amounts of individual metals recaptured from waste by on-site recycling activities can be found in the table of waste management data that concludes this chapter.

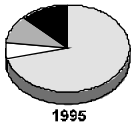
Some facilities reported transfers of metals in waste off-site for treatment by POTWs. Treatment processes employed at POTWs may remove the metal from a waste stream or convert the metal into a less toxic form, but they do not destroy the metal. For example, public sewage treatment plants will remove some fraction of the metals during treatment of the waste stream when removing solid materials. The amounts removed are then generally sent to a landfill for disposal. The metal waste that is not removed remains in the wastewater and will pass through the treatment plant and into the aquatic environment.

OSHA Carcinogens

Some chemicals are listed on the TRI because they are either known human carcinogens or suspect carcinogens (see Box 4-4). Known human carcinogens are those that have been shown to cause cancer in humans. Suspect carcinogens are those chemicals that have been shown to cause cancer in animals. TRI thresholds for reporting known and suspect carcinogens in mixtures are lower for these substances. Table 4-22 shows releases for these chemicals.

Clarification of the Basis for Carcinogen Listings on the EPCRA Section 313 List of Toxic Chemicals

Under section 313, a chemical does not have to be counted towards threshold and release calculations if it is present in a mixture below a certain concentration. This is known as the section 313 “de minimis” concentration in mixture. When the section 313 rule was developed, EPA adopted the de minimis percentages from the Occupational Safety and Health Administration’s (OSHA) Hazard Communication Standards (29 CFR 1910.1200), because much of the information that industry would have relating to chemicals in mixtures would most likely be from the material safety data sheet (MSDS) on that mixture. The OSHA de minimis limitation is 0.1% if the chemical is a

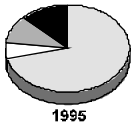


Chemical	IARC[24]	NTP[25]	OSHA[26]
Acetaldehyde	2B	P	—
Acetamide	2B	—	—
2-Acetylaminofluorene	—	P	Z
Acrylamide	2A	P	—
Acrylonitrile	2A	P	Z
2-Aminoanthraquinone	—	P	—
4-Aminoazobenzene	2B	—	—
4-Aminobiphenyl	1	K	Z
1-Amino-2-methylanthraquinone	—	P	—
Amitrole	2B	P	
o-Anisidine	2B	—	—
o-Anisidine hydrochloride	—	P	—
Arsenic and inorganic arsenic compounds	1	K[27]	Z
Asbestos (friable)	1	K	Z
Atrazine	2B	—	—
Benzene	1	K	Z
Benzidine	1	K	Z
Benzoic trichloride	2B	P	—
Beryllium and beryllium compounds	1	P[27]	—
Bis(chloromethyl)ether	1	K	Z
1,3-Butadiene	2A	P	—
C.I. Acid Red 114	2B	—	—
C.I. Direct Black 38	2A	P	—
C.I. Direct Blue 6	2A	P	—
C.I. Direct Brown 95	2A	—	—
C.I. Food Red 5	2B	—	—
C.I. Solvent Yellow 34 (Auramine)	2B	—	—
Cadmium and cadmium compounds	1	P[27]	—
Carbon tetrachloride	2B	P	—
Chlordane	2B	—	—
Chlorendic acid	2B	P	—
p-Chloroaniline	2B	—	—
Chloroform	2B	P	—
Chloromethyl methyl ether	1	K	Z
3-Chloro-2-methyl-1-propene	—	P	—
Chlorophenols	2B	—	—
p-Chloro-o-toluidine	2B	—	—
Chromium (VI) compounds	1	K	—
Cobalt and cobalt compounds	2B	—	—
Creosote	2A	—	—
p-Cresidine	2B	P	—
Cupferron	—	P	—
2,4-D[28]	2B	—	—
2,4-D butoxyethyl ester[28]	2B	—	—
2,4-D butyl ester[28]	2B	—	—
2,4-D chlorocrotyl ester[28]	2B	—	—
2,4-D 2-ethylhexyl ester[28]	2B	—	—
2,4-D 2-ethyl-4-methylpentyl ester[28]	2B	—	—
2,4-Diaminoanisole	2B	—	—
2,4-Diaminoanisole sulfate	—	P	—
4,4'-Diaminodiphenyl ether	2B	—	—
2,4-Diaminotoluene	2B	P	—
Diaminotoluene (mixed isomers)	2B	P	—
1,2-Dibromo-3-chloropropane	2B	P	Z
1,2-Dibromoethane	2A	P	—
1,4-Dichlorobenzene	2B	P	—
Dichlorobenzene (mixed isomers)	2B	P	—
3,3'-Dichlorobenzidine	2B	P	Z
3,3'-Dichlorobenzidine dihydrochloride	2B	P	—
3,3'-Dichlorobenzidine sulfate	2B	P	—
1,2-Dichloroethane	2B	P	—
Dichloromethane	2B	P	—
trans-1,3-Dichloropropene	2B	—	—
1,3-Dichloropropylene	2B	P	—

Box 4-4. Basis of OSHA Carcinogen Listing for Individual Chemicals.[29]

Chemical	IARC[24]	NTP[25]	OSHA[26]
Dichlorvos	2B	—	—
Diepoxybutane	2B	P	—
Di-(2-ethylhexyl)phthalate	2B	P	—
Diethyl sulfate	2A	P	—
Diglycidyl resorcinol ether	2B	p	—
Dihydrosafrole	2B	—	—
3,3'-Dimethoxybenzidine	2B	P	—
3,3'-Dimethoxybenzidine dihydrochloride	2B	P	—
3,3'-Dimethoxybenzidine hydrochloride	2B	P	—
4-Dimethylaminoazobenzene	2B	P	Z
3,3'-Dimethylbenzidine	2B	P	—
3,3'-Dimethylbenzidine dihydrochloride	2B	P	—
3,3'-Dimethylbenzidine dihydrofluoride	2B	P	—
Dimethylcarbamyl chloride	2A	P	—
N,N-Dimethylformamide	2B	—	—
1,1-Dimethylhydrazine	2B	P	—
Dimethyl sulfate	2A	P	—
1,4-Dioxane	2B	P	—
1,2-Diphenylhydrazine	—	P	—
2,4-D isopropyl ester[28]	2B	—	—
2,4-DP[28]	2B	—	—
2,4-D propylene glycol butyl ether ester[28]	2B	—	—
2,4-D sodium salt[28]	2B	—	—
Epichlorohydrin	2A	P	—
Ethyl acrylate	2B	P	—
Ethyleneimine	—	—	Z
Ethylene oxide	1	P	Z
Ethylene thiourea	2B	P	—
Formaldehyde	2A	P	Z
Heptachlor	2B	—	—
Hexachlorobenzene	2B	P	—
Hexamethylphosphoramide	2B	P	—
Hydrazine	2B	P	—
Hydrazine sulfate	—	P	—
Lead and inorganic lead compounds	2B	—	Z
Lindane	2B	P	—
Mecoprop[28]	2B	—	—
Methoxone[28]	2B	—	—
Methoxone sodium salt[28]	2B	—	—
4,4-Methylenebis (2-chloroaniline)	2A	P	—
4,4'-Methylenebis (N,N-dimethyl) benzeneamine	2B	P	—
4,4'-Methylenedianiline	2B	P	Z
Michler's ketone	—	P	—
Mustard gas	1	K	—
alpha-Naphthylamine	—	—	Z
beta-Naphthylamine	1	K	Z
Nickel	2B	P	—
Nickel compounds	1	P[27]	—
Nitrilotriacetic acid	—	P	—
4-Nitrobiphenyl	—	—	Z
Nitrofen	2B	P	—
Nitrogen mustard	2A	—	—
2-Nitropropane	2B	P	—
N-Nitrosodi-n-butylamine	2B	P	—
N-Nitrosodiethylamine	2A	P	—
N-Nitrosodimethylamine	2A	P	Z
N-Nitrosodi-n-propylamine	2B	P	—
N-Nitroso-N-ethylurea	2A	P	—
N-Nitroso-N-methylurea	2A	P	—
N-Nitrosomethylvinylamine	2B	P	—
N-Nitrosomorpholine	2B	P	—
N-Nitrosonornicotine	2B	P	—
N-Nitrosopiperidine	2B	P	—
Pentachlorophenol	2B	—	—

Box 4-4. Basis of OSHA Carcinogen Listing for Individual Chemicals, Cont.[29]



Chemical	IARC[24]	NTP[25]	OSHA[26]
Phenytoin	2B	P	—
Polybrominated biphenyls (PBBs)	2B	P	—
Polychlorinated biphenyls (PCBs)	2A	P	—
Polycyclic aromatic compounds (PACs):			
Benz(a)anthracene	2A	P	—
Benzo(b)fluoranthene	2B	P	—
Benzo(j)fluoranthene	2B	P	—
Benzo(k)fluoranthene	2B	—	—
Benzo(rst)pentaphene	2B	—	—
Benzo(a)pyrene	2A	P	—
Dibenz(a,h)acridine	2A	P	—
Dibenz(a,j)acridine	2B	P	—
Dibenzo(a,h)anthracene	2B	P	—
7H-Dibenzo(c,g)carbazole	2B	P	—
Dibenzo(a,e)pyrene	2B	P	—
Dibenzo(a,h)pyrene	2B	P	—
Dibenzo(a,l)pyrene	2B	P	—
7,12-Dimethylbenz(a)anthracene	2B	—	—
Indeno[1,2,3-cd]pyrene	2B	P	—
5-Methylchrysene	2B	P	—
1-Nitropyrene	2B	—	—
Potassium bromate	2B	—	—
Propane sultone	2B	P	—
beta-Propiolactone	2B	P	Z
Propyleneimine	2B	P	—
Propylene oxide	2B	P	—
Saccharin (manufacturing)	2B	P	—
Safrole	2B	P	—
Sodium o-phenylphenoxide	2B	—	—
Styrene	2B	—	—
Styrene oxide	2A	—	—
Tetrachloroethylene	2B	P	—
Thioacetamide	2B	P	—
4,4'-Thiodianiline	2B	P	—
Thiourea	2B	P	—
Toluene-2,4-diisocyanate	2B	P	—
Toluene-2,6-diisocyanate	2B	P	—
Toluene diisocyanate (mixed isomers)	2B	P	—
o-Toluidine	2B	P	—
o-Toluidine hydrochloride	—	P	—
Toxaphene	2B	P	—
Trichloroethylene	2A	—	—
2,4,6-Trichlorophenol	2B	P	—
1,2,3-Trichloropropane	2A	—	—
Tris(2,3-dibromopropyl)phosphate	2A	P	—
Trypan blue	2B	—	—
Urethane	2B	P	—
Vinyl acetate	2B	—	—
Vinyl bromide	2A	—	—
Vinyl chloride	1	K	Z
2,6-Xylidine	2B	—	—

Box 4-4. Basis of OSHA Carcinogen Listing for Individual Chemicals, Cont.[29]

[24] 1: The chemical is carcinogenic to humans; 2A: The chemical is probably carcinogenic to humans; 2B: The chemical is possibly carcinogenic to humans.

[25] K: The chemical is known to be carcinogenic; P: The chemical may reasonably be anticipated to be carcinogenic.

[26] Z: The chemical appears at 29 CFR Part 1910 Subpart Z.

[27] Certain compounds.

[28] Chlorophenoxy herbicides (IARC 2B).

[29] The list of TRI chemicals meeting the OSHA carcinogen standard and, therefore, reported when in a mixture at a concentration level below the de minimus level of 0.1%, has been updated, and this list reflects the update.

Table 4-22. TRI Releases to Air, Water, and Land of OSHA Carcinogens, 1995 (Alphabetically Ordered).[30]

CAS Number[31]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
75-07-0	Acetaldehyde	1,609,764	11,813,290	225,846	605,885	155,355	14,410,140
60-35-5	Acetamide	7	1	0	920,000	0	920,008
79-06-1	Acrylamide	6,922	12,155	1,929	6,120,154	235	6,141,395
107-13-1	Acrylonitrile	270,587	997,712	9,539	5,193,028	618	6,471,484
60-09-3	4-Aminoazobenzene	0	0	0	64	0	64
92-67-1	4-Aminobiphenyl	0	0	0	2	0	2
90-04-0	o-Anisidine	966	65	74	0	0	1,105
7440-38-2	Arsenic	2,444	4,408	299	0	27,351	34,502
1332-21-4	Asbestos (friable)	1,055	2,590	1	0	131,404	135,050
1912-24-9 (N)	Atrazine	3,468	19,221	1,656	0	637,036	661,381
71-43-2	Benzene	4,039,259	5,239,734	21,300	275,242	16,468	9,592,003
98-07-7	Benzoic trichloride	6,446	50	0	0	0	6,496
7440-41-7	Beryllium	3	832	26	0	22,189	23,050
—	Beryllium compounds	0	360	2	0	23,000	23,362
542-88-1	Bis(chloromethyl) ether	0	0	0	0	0	0
106-99-0	1,3-Butadiene	1,437,480	1,476,081	5,398	0	277	2,919,236
7440-43-9	Cadmium	2,480	9,459	458	0	19,938	32,335
—	Cadmium compounds	7,860	33,253	650	109	49,119	90,991
56-23-5	Carbon tetrachloride	140,135	254,041	717	53,966	0	448,859
57-74-9	Chlordane	823	0	22	0	0	845
115-28-6 (N)	Chlorendic acid	0	6	0	0	0	6
106-47-8 (N)	p-Chloroaniline	11	256	827	0	0	1,094
67-66-3	Chloroform	3,326,071	6,907,283	329,330	33,276	4,297	10,600,257
107-30-2	Chloromethyl methyl ether	11	2,854	10	0	0	2,875
563-47-3 (N)	3-Chloro-2-methyl-1-propene	86	19,543	0	0	0	19,629
—	Chlorophenols	1,960	3,037	30	105,687	0	110,714
6459-94-5 (N)	C.I. Acid Red 114	0	0	0	0	0	0
16071-86-6	C.I. Direct Brown 95	0	0	0	0	0	0
7440-48-4	Cobalt	13,623	20,872	17,295	0	48,334	100,124
—	Cobalt compounds	4,005	22,134	70,388	22,657	180,417	299,601
8001-58-9	Creosote	411,041	494,525	8,294	0	500	914,360
120-71-8	p-Cresidine	1,706	2,900	0	0	0	4,606
135-20-6	Cupferron	0	0	0	0	0	0
94-75-7	2,4-D (acetic acid)	2,580	4,308	1,083	250	4,325	12,546
1929-73-3 (N)	2,4-D butoxyethyl ester	255	255	0	0	0	510
94-80-4 (N)	2,4-D butyl ester	0	3	0	0	0	3
1928-43-4 (N)	2,4-D 2-Ethylhexyl ester	1,510	1,255	250	0	0	3,015
101-80-4	4,4'-Diaminodiphenyl ether	5	18	359	0	0	382
95-80-7	2,4-Diaminotoluene	250	250	0	0	0	500
25376-45-8	Diaminotoluene (mixed isomers)	4,372	5,222	5,522	7,050	55	22,221
106-93-4	1,2-Dibromoethane	7,858	4,514	306	0	256	12,934
106-46-7	1,4-Dichlorobenzene	117,473	126,323	1,287	0	3,100	248,183
25321-22-6	Dichlorobenzene (mixed isomers)	210	5,233	0	0	0	5,443
91-94-1	3,3'-Dichlorobenzidine	5	6	0	0	0	11
612-83-9 (N)	3,3'-Dichlorobenzidine dihydrochloride	0	0	0	0	0	0
64969-34-2 (N)	3,3'-Dichlorobenzidine sulfate	0	0	0	0	0	0
107-06-2	1,2-Dichloroethane	593,163	640,757	5,194	24,339	256	1,263,709
75-09-2	Dichloromethane	22,188,420	33,930,771	28,370	1,140,335	2,064	57,289,960
10061-02-6 (N)	trans-1,3-Dichloropropene	250	6	0	0	0	256
542-75-6	1,3-Dichloropropylene	20,801	10,466	193	0	0	31,460
62-73-7	Dichlorvos	5	250	5	0	0	260
117-81-7	Di-(2-ethylhexyl) phthalate	194,958	334,570	867	0	126,159	656,554
64-67-5	Diethyl sulfate	6,846	132	0	0	0	6,978

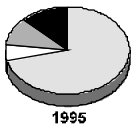


Table 4-22. TRI Releases to Air, Water, and Land of OSHA Carcinogens, 1995 (Alphabetically Ordered), Cont.[30]

CAS Number[31]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
94-58-6	Dihydrosafrole	250	5	0	0	0	255
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0	0	0
20325-40-0 (N)	3,3'-Dimethoxybenzidine dihydrochloride	5	5	0	0	0	10
68-12-2 (N)	N,N-Dimethylformamide	564,526	2,278,664	73,106	1,099,000	1,710	4,017,006
57-14-7	1,1-Dimethyl hydrazine	781	38	0	0	0	819
77-78-1	Dimethyl sulfate	5,154	1,278	1	0	0	6,433
123-91-1	1,4-Dioxane	114,767	108,098	216,689	0	5,736	445,290
120-36-5 (N)	2,4-DP	255	5	0	0	0	260
2702-72-9 (N)	2,4-D sodium salt	0	0	0	0	0	0
106-89-8	Epichlorohydrin	200,269	110,980	26,937	0	18,874	357,060
140-88-5	Ethyl acrylate	98,573	254,678	547	0	523	354,321
151-56-4	Ethyleneimine	0	3	0	0	0	3
75-21-8	Ethylene oxide	430,888	408,341	5,225	130,000	2,208	976,662
96-45-7	Ethylene thiourea	5	520	0	0	0	525
50-00-0	Formaldehyde	1,796,338	9,906,100	277,099	7,313,034	133,825	19,426,396
76-44-8	Heptachlor	203	0	6	0	0	209
118-74-1	Hexachlorobenzene	477	89	6,458	480	0	7,504
302-01-2	Hydrazine	9,931	3,593	3	0	5	13,532
10034-93-2	Hydrazine sulfate	0	0	0	200,000	0	200,000
7439-92-1	Lead	342,989	387,105	10,595	0	2,342,855	3,083,544
58-89-9	Lindane	250	250	0	0	0	500
93-65-2 (N)	Mecoprop	518	1,298	0	0	0	1,816
94-74-6 (N)	Methoxone	755	506	0	0	0	1,261
101-14-4	4,4'-Methylenebis(2-chloro-aniline)	250	10	0	0	0	260
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	5	5	0	0	0	10
101-77-9	4,4'-Methylenedianiline	8,546	1,791	63	23,110	0	33,510
90-94-8	Michler's ketone	0	1,577	0	0	0	1,577
134-32-7	alpha-Naphthylamine	0	0	0	0	0	0
7440-02-0	Nickel	146,458	180,645	23,703	6,370	371,024	728,200
—	Nickel compounds	107,385	156,149	53,029	107,136	2,291,930	2,715,629
139-13-9	Nitrilotriacetic acid	1	0	34	2,900	0	2,935
79-46-9	2-Nitropropane	21,057	10,208	3,000	0	0	34,265
59-89-2	N-Nitrosomorpholine	0	0	0	0	0	0
87-86-5	Pentachlorophenol	1,825	4,441	2,439	0	250	8,955
57-41-0 (N)	Phenytoin	0	0	0	0	0	0
—	Polybrominated biphenyls	0	0	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	0	0	0	0
— (N)	Polycyclic aromatic compounds	80,920	603,381	4,915	0	14,164	703,380
7758-01-2 (N)	Potassium bromate	5	0	0	0	0	5
1120-71-4	Propane sultone	0	0	0	0	0	0
75-55-8	Propyleneimine	564	36	0	0	0	600
75-56-9	Propylene oxide	345,822	493,042	29,934	22,577	4,403	895,778
81-07-2	Saccharin (manufacturing)	90	9	0	0	0	99
94-59-7	Safrole	250	5	0	0	0	255
100-42-5	Styrene	12,115,785	29,359,298	17,570	209,945	171,010	41,873,608
96-09-3	Styrene oxide	1	12	0	0	0	13
127-18-4	Tetrachloroethylene	4,493,166	4,884,751	2,407	20,481	6	9,400,811
62-56-6	Thiourea	872	758	1,487	5,000	250	8,367
584-84-9	Toluene-2,4-diisocyanate	3,666	4,139	0	0	0	7,805
91-08-7	Toluene-2,6-diisocyanate	984	2,060	0	0	0	3,044
26471-62-5	Toluenediisocyanate (mixed isomers)	14,783	33,814	105	0	275	48,977

Table 4-22. TRI Releases to Air, Water, and Land of OSHA Carcinogens, 1995 (Alphabetically Ordered), Cont.[30]

CAS Number[31]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
95-53-4	o-Toluidine	9,557	2,029	256	22,140	12	33,994
79-01-6	Trichloroethylene	12,230,811	13,253,424	1,477	550	3,577	25,489,839
88-06-2	2,4,6-Trichlorophenol	135	26	210	0	0	371
96-18-4 (N)	1,2,3-Trichloropropane	10,251	830	1,600	0	0	12,681
51-79-6	Urethane	124	0	0	0	0	124
108-05-4	Vinyl acetate	1,068,111	2,756,124	8,269	783,829	1,717	4,618,050
593-60-2	Vinyl bromide	43,460	11,470	0	0	0	54,930
75-01-4	Vinyl chloride	319,592	722,011	525	33	1	1,042,162
87-62-7	2,6-Xylidine	54	221	0	0	0	275
	Subtotal	69,018,638	128,344,823	1,505,216	24,448,629	6,817,108	230,134,414
	Total for All TRI Chemicals	385,094,609	1,177,227,504	136,315,624	234,979,709	275,131,965	2,208,749,411

known or suspect carcinogen by virtue of appearing in one of three sources:

1. National Toxicology Program (NTP), "Annual Report on Carcinogens" (Latest Edition);
2. International Agency for Research on Cancer (IARC) "Monographs" (Latest Editions); or
3. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

The de minimis limitation is 1.0% for chemicals that do not meet the above OSHA carcinogen criteria. The carcinogen designation in the list of chemicals relates to any chemical that the Agency determined met the above OSHA criteria for the 0.1% de minimis limitation. Box 4-4 shows the specific bases for which the individual chemical was designated as a known or suspect carcinogen. This list was recently updated based on a review of the NTP, IARC, and OSHA sources.

Certain metal compound categories have two de minimis limitations. For example, hexavalent chromium compounds and inorganic arsenic compounds meet the OSHA carcinogen criteria, while trivalent chromium compounds and organic arsenic do not meet the OSHA criteria. Release and transfer information on these groups is included in Table 4-22, even though not all compounds may meet the criteria.

Table 4-22 provides the releases for OSHA carcinogens reported to TRI. Of the 116 carcinogens for which TRI forms were submitted in 1995, 21 are newly added chemicals. Total releases of all OSHA carcinogens were 230.1 million pounds, including 5.4 million pounds of the newly added OSHA carcinogens.

Releases and Transfers of All TRI Chemicals

Releases and transfers of all TRI chemicals reported in 1995 appear in Table 4-33. This table, and a similar table presenting waste management data, occur at the end the chapter.

[30] The list of TRI chemicals meeting the OSHA carcinogen standard and, therefore, reported when in a mixture at a concentration level below the de minimus level of 0.1%, has been updated, and this list reflects the update.

[31] Compound categories do not have CAS numbers (—).

(N) Newly reportable in 1995.